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NEW ZEALAND
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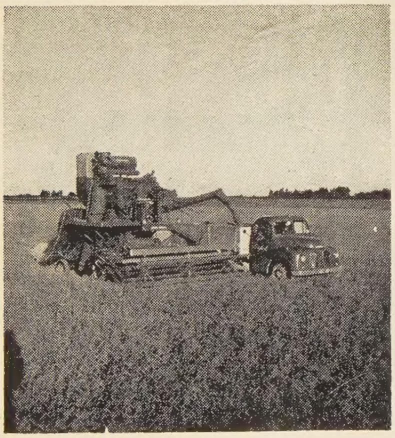

One man with a large bulk header can harvest as much grain (about 2,000 bushels) as was commonly threshed 40 or so years ago by 10 men with a traction engine and big mill. Though the first bulk header was operated in Canterbury 30 years ago, most grain was bagged until recently. Advantages of bulk handling, what conversion to the system involves, and how bagging headers can be modified for bulk operation are described in the opening article in this issue.

[*Robin Smith*

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Bulk Grain Harvesting

By C. J. CROSBIE,
Farm Advisory Officer (Machinery)
Department of Agriculture,
Christchurch

Bulk harvesting of grain, now becoming popular in New Zealand and replacing bagging methods, enables growers to get their crops in easily and quickly and with a minimum of labour, so that full advantage can be taken of harvesting weather

[*Benson*

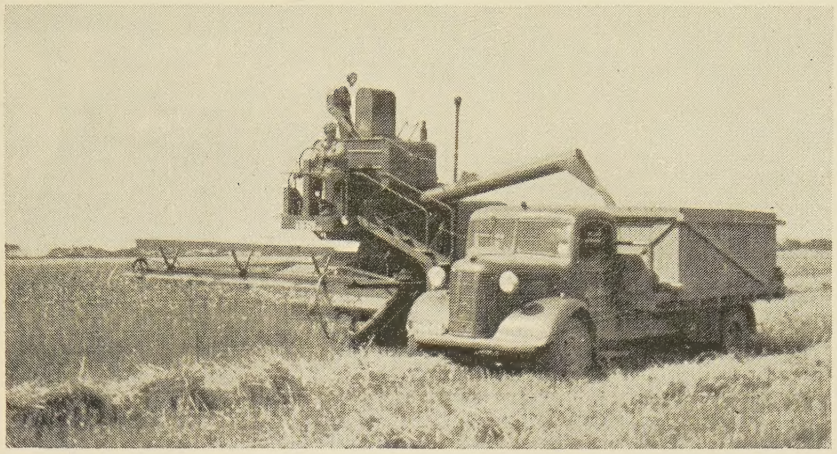
▲ A modern bulk header working in a field of peas.

A recent model dual header → that can be converted from bulk to bag work in 10 seconds.

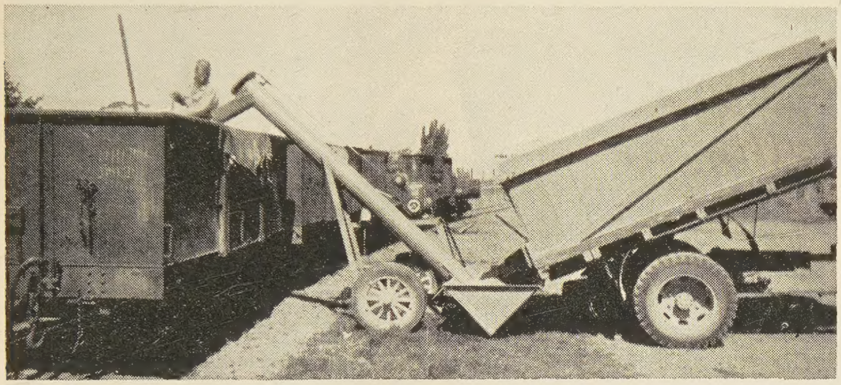
[*Standish and Preece*

THOUGH the first bulk header was introduced to the South Island 30 years ago, only a few venturesome farmers with 100 to 150 acres in wheat and barley adopted the system until 1960, when smaller growers realised the advantages of bulk harvesting. Last season, as a result, about 21 of these machines were working in the South Island and it is estimated that 50 will be operating this year.

BULK GRAIN HARVESTING



▲ Bulk grain is often direct headed and carted straight to the rail, where it is loaded on to wagons by power auger or chain and flight elevator. ▼



In Canterbury more than 2,400 header harvesters are in operation, but with labour very short during the harvest season the focus is now on bulk headers, where, with a large machine, one man can harvest in a good day as much grain (2,000 bushels) as did a team of 10 to 11 men with a traction engine and a big mill in the 1900-1930 periods.

Whereas with the larger self-propelled bagging machines, a driver and three bag sewers are required to harvest grain at, say, 200 bushels per hour, this rate is maintained all day with a large bulk header and one man.

In a day of 10 heading hours two men—one on the header and one on the farm tiptruck—harvested 40 acres of wheat, averaging 50 bushels per acre, and that night 2,015 bushels (about 50 tons) were sheeted down in four railway wagons on a siding 2½ miles from the farm.

In one day another farmer working on his own and alternately driving the header and the truck harvested and trucked to the rail 1,000 bushels of wheat.

This labour saving at harvest when fast bag sewers are getting fewer and harder to hire will appeal to many farmers who are experiencing labour troubles.

Finance

In New Zealand bulk grain sells for the same price as bagged so that any expenditure entailed in the changeover to bulk harvesting must be financed from the savings in sacks, labour, and twine (£1 an acre for a 50-bushel crop), but there are other savings that result from the speed and ease of the bulk harvest: no bags have to be turned in inclement weather, no bags are lost in a fire, and cultivation or grazing of the stubble can begin immediately.

The rights to farm-store wheat to relieve the pressure on transport and at the mills during the harvest and the increments for farm storage (reaching 9d. per bushel in September) are equally available to bulk and bag farmers, but the bulk farmer is more likely to avail himself of this, for if his grain has to be binned while waiting for transport, it is easy to leave it there until the maximum increment pertains and his grain is also less likely to suffer rodent damage.

On a bulk farm the walls of a 20-ton plywood bin cost about £40 and its contents return an increment of £30 in the first season if sent to the mill after September.

Thus, with wise spending and the use of existing facilities, the changeover to bulk harvesting is reasonably self financing and this is equally true for the small grower.

Different Systems

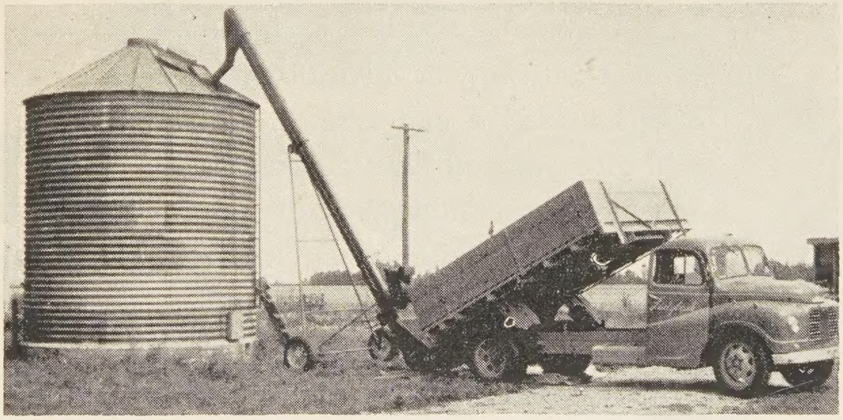
There are at present a number of different systems of operating bulk headers.

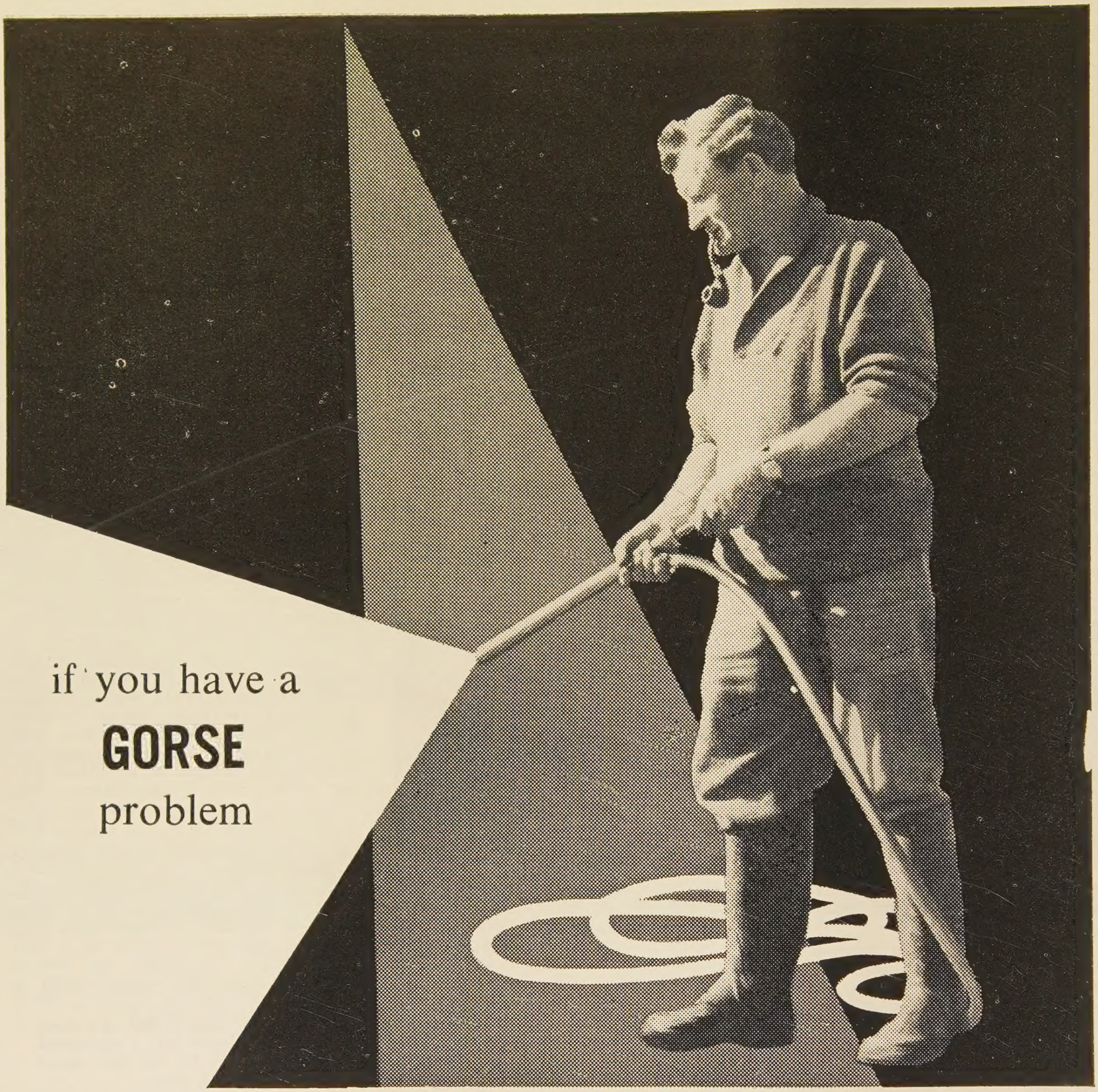
In areas where flour mills are not fitted up to receive bulk wheat, or for other reasons, the bulk header is used to harvest the grain, which is then augered directly into the raised tray of a tiptruck or farm trailer and the grain is then bagged off by spouts and bag holders fitted in the tailboard.

As the dump of bags grows the truck or trailer is moved up the field so that the filled bags are carried only a minimum distance.

Bag sewers stand comfortably on the ground under this system away from the noise and dust and close more bags this way than when riding on a bagging header, especially on downs country. Also, the bagged grain is

▼ Bulk oats being loaded by a chain and flight elevator into a corrugated steel bin. This bin will store about 2,000 bushels.





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uplifted by road cartage contractors at a cheaper rate from dumps than from scattered rows in a field.

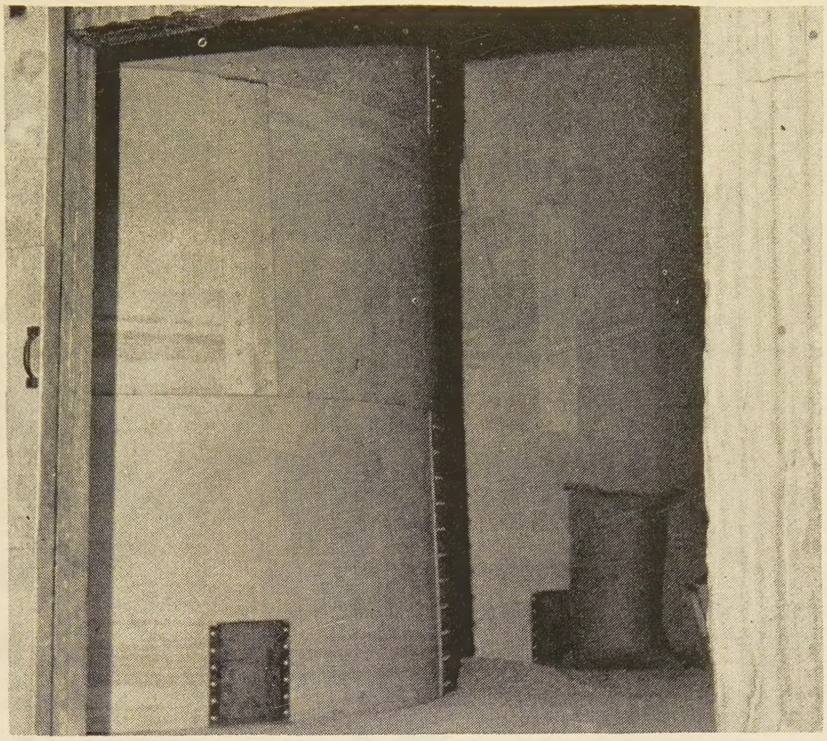
Within the 30-mile rail limit bulk grain is often carted direct from the field to the mill. Two 5-ton road vehicles carting 28 miles to the mill, operating a two and a quarter hour turn-round, have kept pace with a medium-sized bulk header averaging about 4 tons per hour.

Field bin storage in two 3-ton farm tip trailers and a loader with a 30-ton per hour capacity ensured minimum loading time for the road trucks. For larger headers averaging 5 tons per hour, and for longer road hauls, either larger or more road trucks are required. A large steel articulated truck with extended wooden sides has been used to haul about 11½ tons of grain to the mill.

A further development of this system is to cart the bulk grain from the field to the farm yard in tip trailers and then auger it into a road vehicle or, if the vehicle is not present, unload it on to the concrete floor of a shed, where the reservoir of grain provides steady road haulage for one road truck operating an eight-hour day irrespective of weather and what hours the header works in a day.

Outside the 30-mile rail limit bulk grain of necessity goes to the mill in railway wagons. In the past a number of growers have carted their bulk grain direct from the field in tip farm trucks to the rail siding, where the grain is tipped into small hoppers and thence elevated by an auger or chain and flight elevator.

More recently high loading banks have been used (6 ft high) and the trucks are backed up them and unloaded direct into the railway wagon.


[*Benson*

Bulk grain can be stored in existing sheds in plywood bins which can be built from pre-cut materials available to make 20- and 30-ton models. Eight 20-ton bins were used to store 150 tons of wheat in this shed last season.

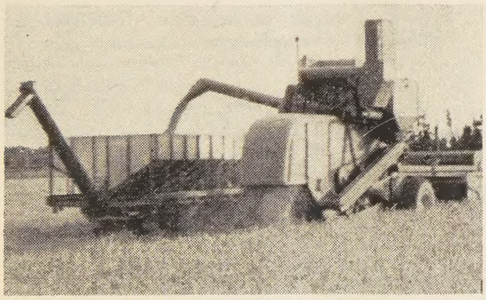
Tiptrucks with a long tray overhang are better suited than short metal dump trucks, for most loading banks are sited 2 ft away from the edge of the railway wagon to provide safe clearance for rail staff during shunting.

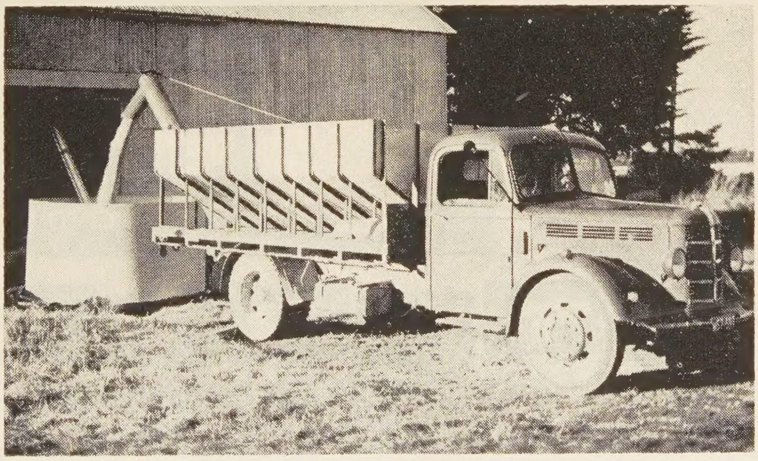
By this system a 3-ton tiptruck operating from a farm two miles from rail makes a turn-round trip in about 20 minutes when a chain and flight elevator is used at the siding and it can keep pace with a large bulk header averaging 4½ to 5 tons per hour. If the farm is further from the rail and the truck turn-round time longer, a self unloading field bin is necessary to obviate header stoppages.

However, if instead of an elevator at the rail siding a high loading bank is available, the truck unloading time will be reduced to about a minute and so the road haul can be correspondingly longer.

More recently, owing to the increasing number of bulk headers and the increasing wheat acreages (63,000 acres

▼ For non-tipping flat-top farm trucks or trailers a self-unloading bulk grain hopper is useful. Powered from the truck's p.t.o. shaft or from an independent motor, an auger in the bottom of the V hopper conveys the grain back to another auger which elevates the grain for → delivery either to the granary or at the rail. Such bulk grain hoppers can be made from angle iron and heavy galvanised iron sheeting or from slotted angle and plywood.





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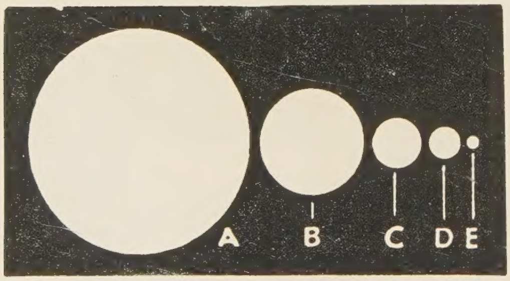

A—Particle of typical domestic flour.

B—Particle of high quality face powder.

C—Size of a Red Blood cell in the human body.

D and E—Typical particles of TARTAN FENODREN Phenothiazine.

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in 1958, 120,000 acres in 1959, 190,000 acres in 1960, and an estimate of over 200,000 acres next season) some growers, to avoid delays in road and rail haulage, are making provision to farm store their bulk grain.

Bulk barley is required in store as soon as possible after harvest. It and bulk wheat out of farm storage can often be railed on days after a heavy shower when bagged grain in the district cannot be railed because the bags are damp.

After that portion of the wheat harvest that is required to finance current farm operations has been sent off, the remainder can be farm stored (and a price increment obtained to cover this storage period) until late in the year. It can then be sent to the mill when transport is available and the mill has storage to receive it.

Farm bulk stores can be new buildings specially built for the job or existing buildings altered to house metal or plywood round bins which within themselves absorb the forces exerted by stored bulk grain.

In both types of granary the same principles apply: the grain must be of the correct moisture level for bulk storage (15 per cent for 12 months' farm storage) and it must be protected from outside moisture. The concrete floors of such sheds should incorporate a moisture barrier and the concrete should be poured three to four months before use to allow it to dry out.

Grain Dryers

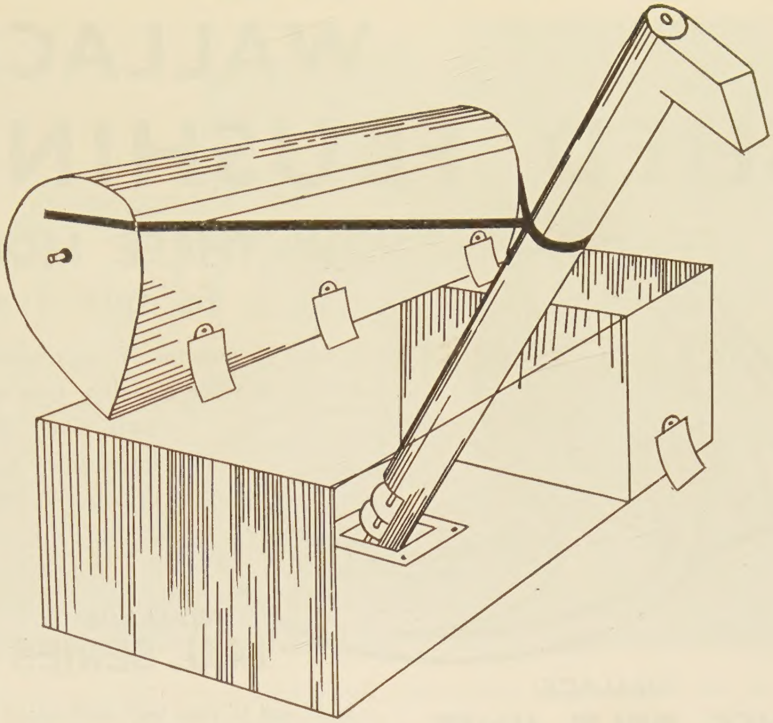
In Canterbury in an average season wheat ripens in the field to a moisture level of 15 per cent or less and is suitable for bulk storage. Every four or five years the harvesting season is poor and in such a season bulk operators will have the choice of two systems: they can either bag off the grain and open stack it until it cures in the bag (as they have done for the last 30 years), or they can install a dryer. As the amount of moisture to be removed is not high—not more than, say, 3 per cent—the system most likely to be installed is the in-bin dryer, where storage bins are fitted with ducts or ventilated floors and drying can be cheaply effected at a slow rate of about ½ per cent moisture removal per day.

In Southland, where a lot of grain is harvested at about 20 per cent moisture, dryers with a faster moisture removal rate are more likely to be popular and one very suitable cheap type—the tray dryer—has already worked one season on drying bulk wheat. The other fast grain dryers—the tower and cascade types—will find a place with New Zealand growers.

The Dual Header

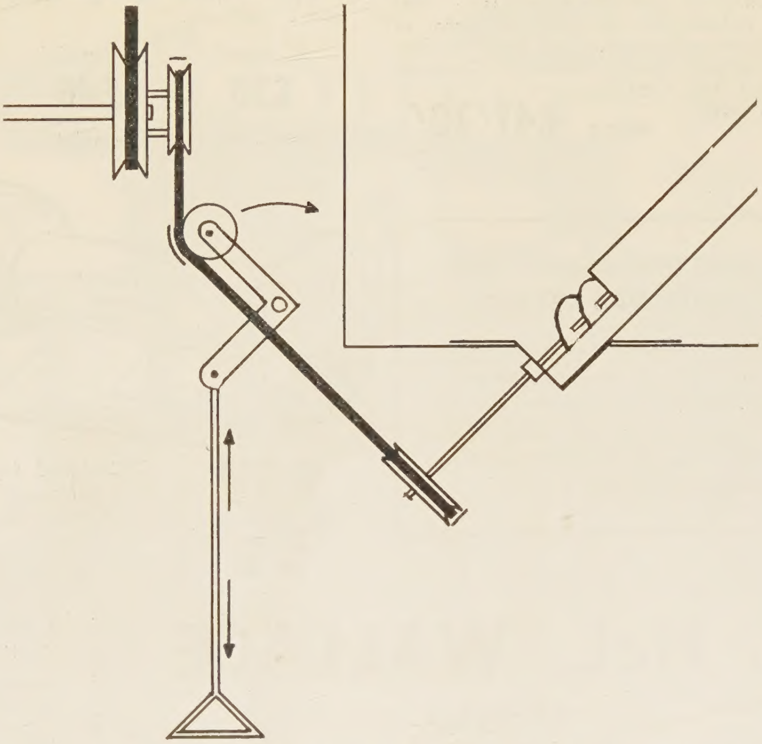
Farmers with a modern header in good order, or those who do not bulk handle all their crops, do not need to sell their old machine and buy a complete new bulk header or a tank and auger for fitting to their present unit.

It may be more desirable to alter the present header so that it is capable of doing both bag and bulk work, and a solution is offered in the sketch on this page. Briefly, the procedure is to encase the bagging platform on the three open sides with removable plywood or sheet-iron and fit a centre division piece and a slide to handle the seconds. A suitably shaped piece



▲ Schematic conversion of bagging header for dual bag-bulk work.

▼ Schematic arrangement of auger drive from existing pulley on header.



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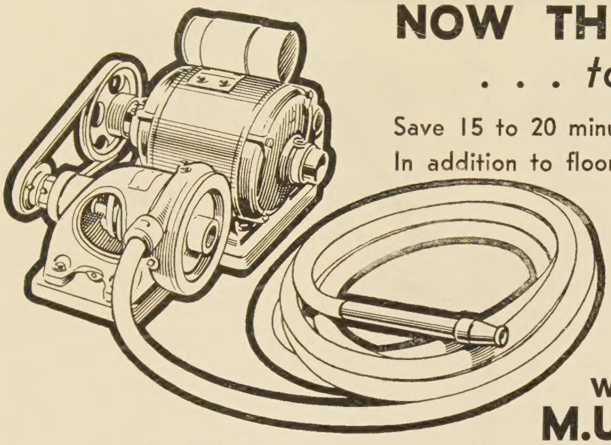

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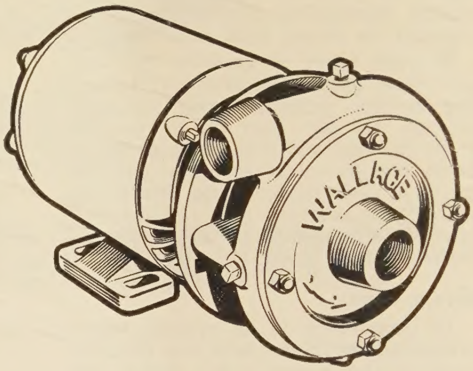

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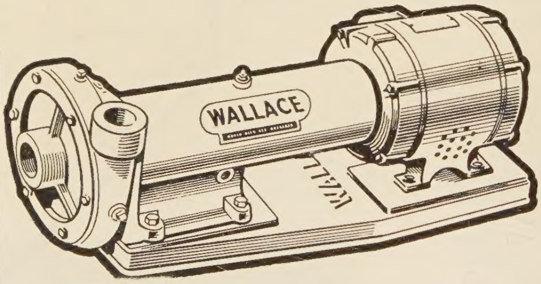

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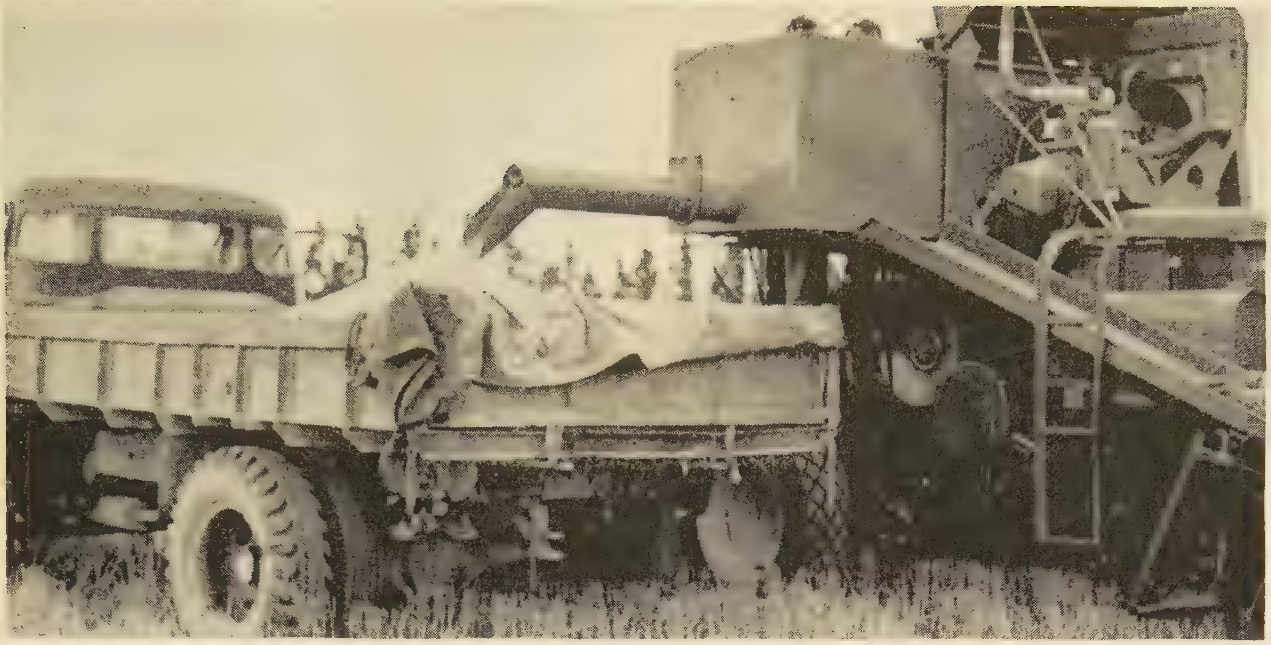


[*Fyfe*

Bagging headers can be converted to dual machines capable of bag and bulk work. This machine has a removable steel bin and auger fitted into the bagging platform.

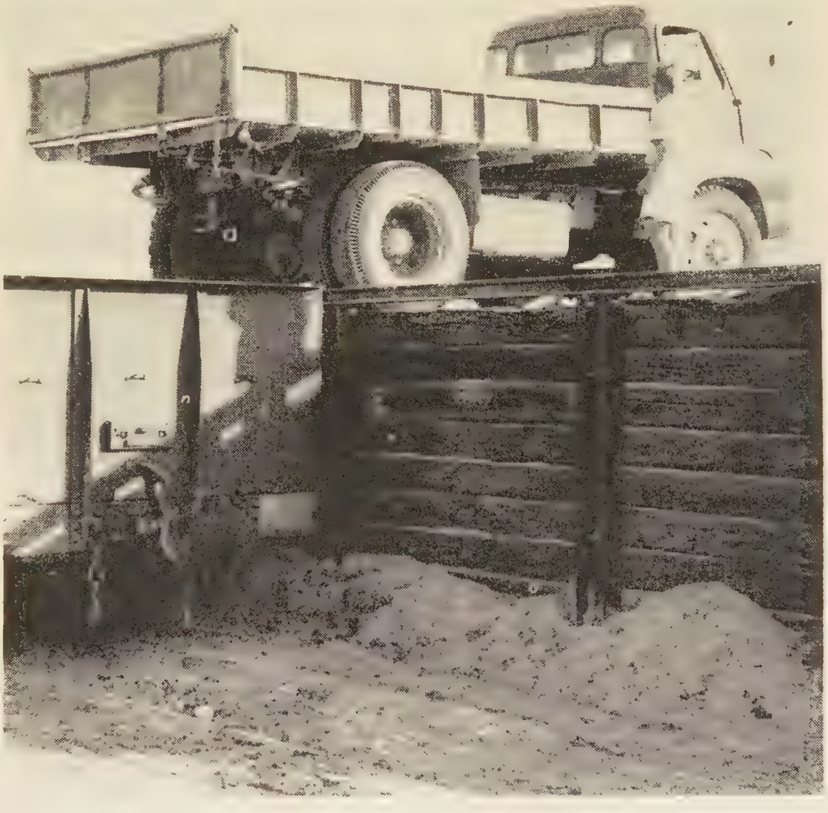
can be fitted in a hole cut in the floor to receive the base of the auger and an auger drive arranged to a sheave bolted on to an existing pulley on the side of the mill.

To control the auger one of the belt guide pulleys will be mounted on a bell crank with a push-pull lever fitted. Guide strips with suitable clearance will hold the belt on to the respective sheaves. Auger speed should be about 700 r.p.m. and at this speed a 6 in. auger on a 5 ft to 6 ft header will unload about 30 tons per hour at 45-degree slope. A 9 in. or 10 in. auger will unload 60 tons per hour or more and is more suitable for the larger self-propelled machines.

To revert to bagging work all that is required is the removal of the auger and two of the sides of the grain bin and a plate fitted over the hole in the floor. This should take about 10 minutes. It is not necessary to fit sloping floors to the grain bin of such dual headers, for the grain under the angle of repose will not flow out and it automatically forms the sloping floor. Such grain need only be tidied up at the end of a run.

Moisture Testers

Farmers bulk handling grain crops should have easy and quick access to moisture testers. Ideally each grower should own an accurate quick tester and, preferably, it should need only a small grain sample to enable it to be easily used before, during, and after the harvest. Pre- and post-harvest samples tend to be small and



If tonnage offering warrants it, New Zealand Railways will erect at suitable sidings high loading banks so that tiptrucks can discharge straight into wagons, reducing loading time and making longer road hauls possible.

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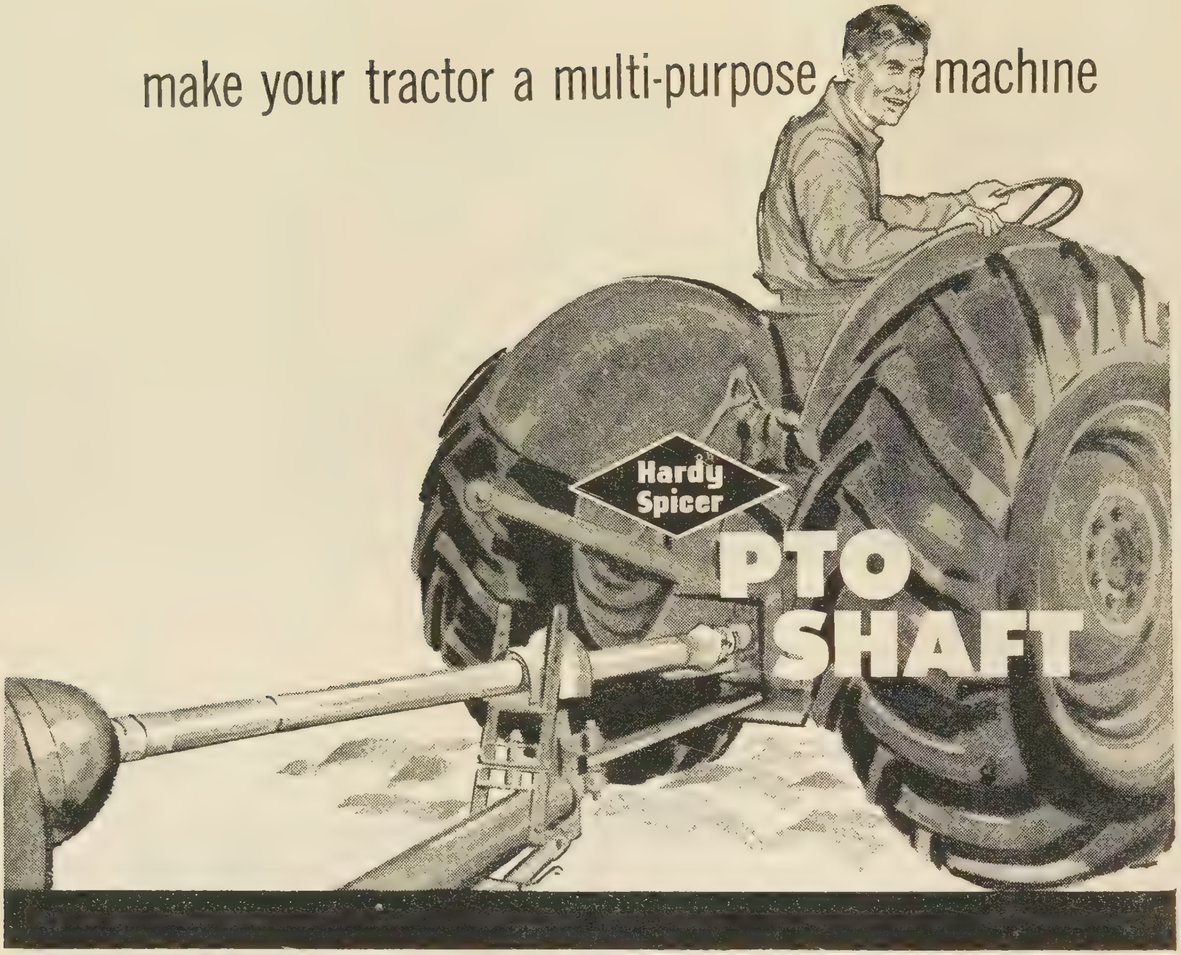

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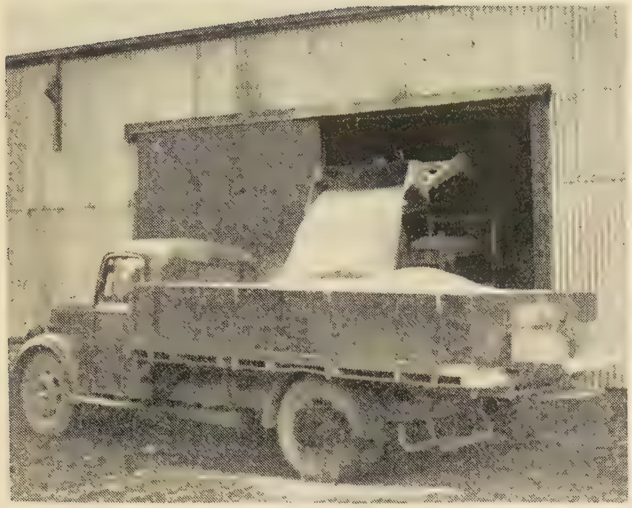
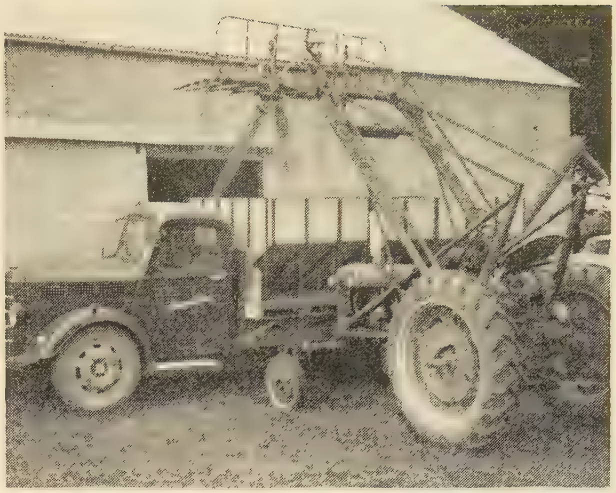


▲ Loading out bulk oats from a granary with a tractor-mounted front-end loader.



▲ Loading out bulk grain from plywood bins in a farm shed. The outer end of the auger is supported by a front-end loader.

totally inadequate for the containers supplied with some testers.

Moisture testers are available in New Zealand at a range of prices and selection should not be difficult.

Range of Crops

Wheat, barley, and linseed have been sent to the mill in bulk in New Zealand, but a few mills are not fitted up to receive grain in bulk, and it is wise for the grower to make arrangements before the harvest with his firm or miller.

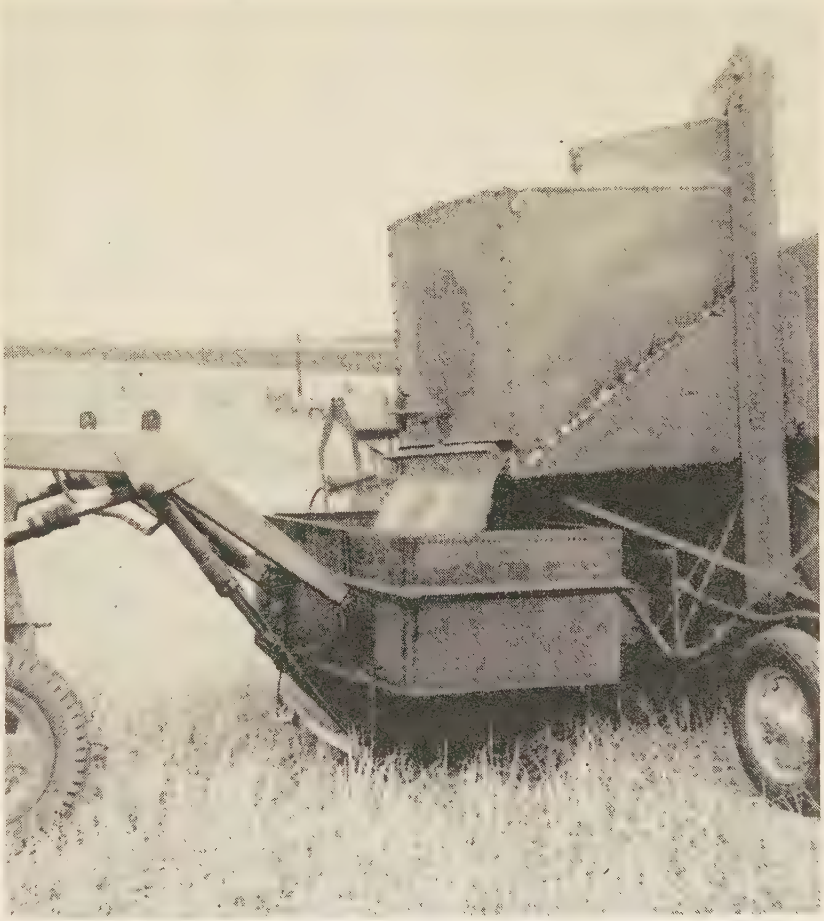
Oats have been forwarded to the mill in bulk by local arrangement with the miller.

Other bulky crops that have been harvested in bulk and then bagged off in the field or granary are the ryegrasses, linseed, field peas, ryecorn, and lupins. Economies have been achieved, especially when the crop has been machine dressed or cleaned in the granary to make it a more presentable sample for the buyer. In the handling of peas and lupins it is desirable to have as wide as possible clearance between the auger and its outer shell housing, and this is specially so with garden peas, where it is preferable for augers to be replaced by chain and flight or belt and cup elevators.

When white clover is harvested with a bulk header the crop can be augered direct from the bulk tank into sacks held open on the tray of a truck or trailer.

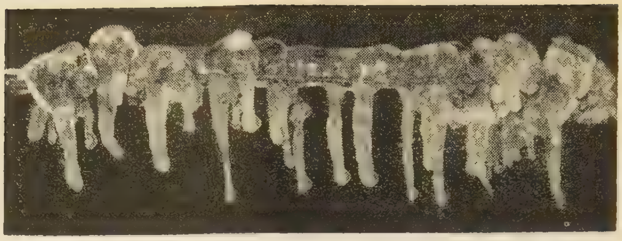
Because of the short harvesting days, one tank full is often sufficient when harvesting red clover and lucerne seed and the crop is bagged off into sacks on the loading bank of the granary each evening before the header is put away under cover.

▼ This bagging header was converted for bulk work by fitting of a square steel bin with a sloping floor. The contents discharge into a hopper on the tractor's front-end loader.



[Fyfe

ROUND THE RESEARCH STATIONS



[*J. F. Shepherd*

An apricot twig that was sprinkled for 10 hours during a heavy frost. The diameter of the ice tube was about four times that of the twig.

Current Work and Findings in Department of Agriculture and Department of Scientific and Industrial Research Trials and Experiments

Earnscleugh

Ice Protects Fruit Trees Against Frost

Every spring there is a strong probability that much of the Central Otago apricot and cherry crop will be destroyed unless some method of frost protection is used. Many orchards are now equipped with oil-burning fire pots, which protect against most frosts, but operating costs are high, and greasy soot deposited over everything in the vicinity makes frost fighting one of the dirtiest jobs in agriculture. Any reasonable improvement would be more than welcome.

One possible alternative is to sprinkle water over the trees to be protected. As water changes from liquid to ice the release of a considerable amount of latent heat holds the mixture of water and ice at freezing point as long as there is still free water present. When a tree is sprayed with water under frost conditions ice rapidly forms all over it, but the temperature of this ice does not fall below 32 deg. F as long as further water is added continuously. Blossoms and young fruits of stone fruit trees can tolerate being held at freezing point all night.

At the Earnscleugh Research Orchard of the Department of Scientific and Industrial Research it was demonstrated in 1959 that such sprinkling protected those apricots which received adequate water during the 15 moderate frosts of that season. As the sprinklers used gave uneven water distribution, only trees close to each jet carried a crop. Last year two improved types of overhead sprinkler were installed to protect blocks of apricot trees.

A water spray may offer a much better solution to the frost problem than fire pots, but several practical difficulties make further experiments necessary. Water supplies in Central Otago are very limited on many properties and costs of installing overhead irrigation are high, so that the method may be uneconomic. In severe frosts large quantities of ice form on sprinkled trees, with considerable risk of branches breaking. Several successive frost nights are not unusual, and as water must be supplied at 1/10 in. per hour throughout each frost, root and soil problems may arise from excessive watering. Frequent sprinkling may also increase the incidence of fungous and bacterial diseases.

A final doubt is that low relative humidities may make sprinkling dangerous. When water evaporates it takes up heat from surrounding objects, so that sprinkling in low humidity could increase frost injury rather than prevent it.

The experiments at Earnscleugh should provide the information necessary to assess the value of this method for Otago conditions.

Wallaceville

Respiratory Diseases of Poultry

These constitute one of the greatest disease problems affecting birds soon after introduction to the laying houses from range. When any of these diseases occur immediate steps should be taken to prevent rapid spread throughout the laying house.

Care should be taken to see that birds are not overcrowded and that there is adequate perch space and good ventilation. The ration should be adequate in protein and vitamin A.

At the first signs of the disease, affected birds should be treated with full doses of one of the wide spectrum antibiotics such as terramycin, aureomycin, or streptomycin, and two or three of the early cases should be sent to a diagnostic centre for diagnosis.

Wallaceville

Molybdenum and Copper Deficiency

Brain and spinal cord lesions have been found in experimental lambs grazing molybdenum topdressed pastures at Wallaceville. It is not yet known whether these abnormalities are typical of those found in copper deficiency due to a high molybdenum intake, and specimens are to be submitted to an overseas expert for an opinion.

New Minister a Farmer First

LIKE many of his generation who started farming in the early 1900s, Mr W. H. Gillespie, who was appointed to the portfolio of Agriculture in Mr Holyoake's Cabinet announced in December, attained his North Canterbury property, which he is still actively farming, only by hard work and persistence through the disappointments and setbacks of lean periods for the man on the land in the 20s and 30s and the interruptions of overseas service in the First World War and home service in the second.

BORN at Flaxton in North Canterbury and eldest of a family reared on a 40-acre dairy farm at Ashley Gorge, near Oxford, he had early to help a widowed mother with family and farm responsibilities, and started work at 14 in a district where agriculture was and still is as diversified as anywhere else in the country.

In recent years about 700 acres of Mr Gillespie's 1,800-acre property at Bennetts has been in the ownership of his son, but the farm is still managed as a unit. It carries 3,000 sheep and 250 cattle, and about 400 acres are under the plough annually for the growing of wheat, oats, barley, linseed, and certified ryegrass and white clover seed crops.

As could be expected of one whose apprenticeship included driving an eight-horse team for wages of £1 a week, Mr Gillespie's views on the work of his new office, as expressed to the "Journal", were essentially those of a man with wide practical experience of production and financial aspects of farming and a knowledge broadened by many years of public service. He was for 20 years a councillor of the Oxford County Council, with a term as chairman, a director of the New Zealand Farmers' Cooperative Association, Christchurch, for 19 years, served on his district's Primary Production Committee during the late war, and was in command of the Oxford unit of the home guard. He has been a member of the board of governors of Canterbury Agricultural College, Lincoln, for 12 years, for the last 10 years as chairman. Since he was elected Member of Parliament for Hurunui in 1943 he has been closely associated with agricultural inquiries and debates in the House of Representatives.

Advisory Services

"My main concern for the farming industry which I have the privilege to represent as Minister will be to see that the enthusiasm and drive which are needed to maintain the production increases that are essential to the continuance of our standards of living are given every encouragement," said Mr Gillespie. "Given the knowledge and the means, our farmers are quick to capitalise on them, and if our research and extension services can be strengthened and encouraged to keep pace with the increasing demand, I think the farmer can be depended on to complete the job. We have had ample evidence of this in recent years in the great increases in carrying capacity and production by the application of new techniques.

"The specialist services that have been provided by the Department of Agriculture to the farm improvement club movement since its inception will be continued so that if farmers desire the more personal service of their own clubs, they will be assured of getting through their club advisory officer the latest information coming to hand from the experimental and research work of the Department.

"The increasing rolls of agricultural students at the two agricultural colleges are one of the most heartening portents for the primary industries in recent years, and it seems certain that the recruitment prospects for research and advisory services will be better in the near future than they have been for some time. Every effort will be made to reach an early decision on the provision of veterinary training facilities in New Zealand, and the need for extension of diagnostic services will be watched closely.

Land Improvement

"Widespread trials and experiments and the development of new techniques have shown the tremendous potential of much of our hill country, both tussock and surface sown, and of much of the light plains land of the South Island. Very impressive development is already being undertaken both by the State and privately, and the utmost assistance will be given in hastening the improvement of hitherto underdeveloped or marginal land. The setting up recently of the Tussock Grasslands and Mountain Lands Institute at Lincoln should ensure a much needed correlation of a diversity of information that will be of value to the high country farmer with his special problems of conservation, utilisation, and management.

Fertiliser Usage

"The increased use of fertiliser shown in the Department of Agriculture's latest returns is an encouraging sign that farmers generally are meeting the requirements to keep their land in good heart. In no other aspect of agricultural research have there been greater advances recently than in knowledge of soils and their requirements in our pastoral economy. Fertilisers can now be applied not on a guesswork basis but with a very precise knowledge of the particular requirements of the land to maintain fertility in the complex of soil-plant-animal relationships. It is not enough to use a lot of fertiliser; it is of paramount importance to use it intelligently in this era when production costs are so crucial to our ability to maintain our place on overseas markets. Soil testing and fertiliser advisory services of the Department of Agriculture should be the basis of fertiliser practice.

Beef and Wheat Production

"We should undoubtedly give more attention to the production of beef. Our farming generally would be better with a higher ratio of cattle to sheep, and the market prospects seem to be bright for the disposal of much more of this class of meat. We should continue too to capitalise on the potential of the new higher-yielding wheat varieties by raising the acreage planted to the point where self-sufficiency is again in prospect.

Producer Organisations

"Freedom for the farmer individually in his business and collectively in his producer organisations has been the basis of discussions I have already had with industry representatives. My concern will be to maintain the services he needs and, by following a policy of close consultation with his leaders, to ensure the advice, cooperation, and help of Government if and when needed," the Minister concluded.

Care of Livestock during March

By Wallaceville and Ruakura Animal Research Stations

WINTER MANAGEMENT

NOW is the time to plan the winter management programme on the dairy farm. This programme should have four aims:

To obtain as much butterfat as possible during the rest of the season.

To winter the maximum number of stock.

To have the milking herd in reasonable condition at calving.

To have sufficient feed on hand to meet the herd's requirements from calving until the spring growth comes away.

DRYING OFF

Cows can be profitably milked to within 60 days of calving as long as they are giving 10 lb or more of fat per month. However, if this results in an undue loss of condition, so that next year's production would be penalised, it would be advisable to dry them off at an earlier date.

STOCKING RATE

Ruakura research has shown that the number of cows carried is the most important factor influencing total output of butterfat. Since the carrying capacity of a farm is determined by the number of animals which can be wintered, the number of stock should be lifted to a maximum compatible with available feed reserves and labour supply.

GRAZING MANAGEMENT

Grazing management during autumn is a key factor in any wintering programme. Decide now which paddocks are to be closed for autumn-saved pasture and graze these out during the next month to remove all rough feed. On the rest of the farm allow as much feed as possible to accumulate for use in late autumn and early winter. On many farms it will be necessary to stop grazing more than half the farm from mid April to provide the minimum requirements of ½ acre of autumn-saved pasture per cow.

FEED RESERVES

Research studies have shown that the most critical period in the feeding of dairy cows is from six weeks before to six weeks after calving. Hence the importance of the two final aims of the wintering programme. Every farmer should take stock of the amount of silage and hay on hand and relate this to the number of animals to be wintered.

Ten bales of hay plus 1 ton of silage per cow have been found necessary at Ruakura to meet adequately the needs of the herd and replacement stock. In districts with longer winters than those at Ruakura these amounts would need to be increased or supplemented with crops.

FEED HAY TO CALVES

Calves should have access to good hay at all times. It is particularly valuable after the first autumn rains, and will greatly assist in preventing the severe scouring which sometimes occurs after the grazing of lush, rapidly growing pasture. Make sure that the calves are rotated through the paddocks at intervals of a few days. Set stocking at this time of the year is bound to result in scouring, unthriftiness, and some deaths.

CULLING OF EMPTY COWS

A cow should never be culled for sterility without being examined for pregnancy by a veterinary surgeon. Many cows thought to be empty have proved to be in calf when slaughtered at the works. The presence or absence of heat is not an infallible guide in diagnosing pregnancy. Good producers which are empty may be worth keeping, as about 80 per cent of such cows hold when mated in the following season.

BLOWFLY STRIKE IN SHEEP

Blowfly strike is likely to occur in showery autumn weather when the humid conditions do not allow rapid drying of the fleece. Constant supervision is necessary to ensure that all cases are treated in the early stages. Shear the wool so as to leave a clear margin all round the strike. Watch carefully for narrow tracks leading to areas some distance from the original strike. Treat with a good non-irritant dressing. Since some strains of sheep blowfly have become resistant to chlorinated hydrocarbons such as aldrin and dieldrin, organophosphorus insecticides such as diazinon and ronnel should be used for treatment and prevention.

LEAD POISONING IN CATTLE

Among the mineral poisons lead is still the greatest killer of cattle on the farm. They will eat any form of lead like old paint from tins, lumps of white or red lead, plumber's scraps that have been discarded, and old accumulators. Calves develop a depraved appetite for lead paint and lick and chew at surfaces, particularly where the oil film has broken down and the paint is dry and flaking. Once calves have developed this appetite they will chew through new non-lead paint to get at the old lead paint underneath.

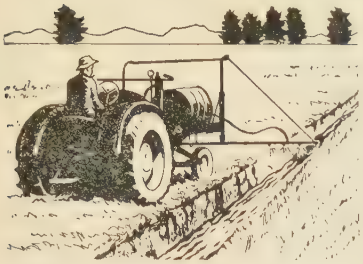
PULPY KIDNEY VACCINATION OF EWES

If losses from pulpy kidney are usually experienced in lambs under six weeks of age, they can be prevented only by vaccinating the ewes. If ewes have not been vaccinated in previous years, the first dose should be injected when they are crutched before tupping, and another dose should be injected just before lambing. Ewes which have been vaccinated in previous years require only the pre-lambing injection. Vaccination should be done in temporary yards. Syringes should be boiled before use and needles should be kept in methylated spirit and wiped and changed each time the syringe is filled. Vaccination of ewes will not be effective in preventing losses in lambs over six weeks of age. Where such losses occur it is necessary to vaccinate the lambs themselves.

Seasonal Notes

By Farm Advisory Division

CLEANING DRAINS CHEMICALLY



CLEANING farm drains annually by hand or mechanically can be both arduous and expensive. If the drains are otherwise in good order, unwanted vegetation can usually be controlled cheaply and effectively by spraying, the two weedicides commonly used being dalapon plus amitrol. As both are water soluble, they should be used in fine weather only; otherwise their effectiveness is likely to be impaired. In some circumstances, notably where there are rushes, watercress, buttercup, or convolvulus as well as grasses, the addition of a hormone weedkiller, the ethyl ester of 2,4-D, is also recommended. Blackberry poses another problem and will require 2,4,5-T.

The rates at which these weedkilling chemicals are used is determined by the nature of the vegetation to be controlled. Some grasses and weeds like blackberry are not easily killed unless they are sprayed at the right time. Blackberry control is best attempted from December onward, and reed sweetgrass (*Glyceria maxima*) should be sprayed from February until the end of May. Other more difficult grasses to kill are paspalum and tall fescue, for which 10 lb of dalapon plus 5 lb of amitrol per acre are recommended. To this add 2 lb of acid equivalent (usually 3 to 4 pints) of hormone where rushes, watercress, etc., are also present.

As the residual life of dalapon and amitrol is limited, two sprayings, one in spring and the other in autumn, will generally be required where it is desired to keep drains weed free throughout the year, but one spraying in February or March will clean them for the winter.

—*D. M. E. MERRY, Pukekohe*

* * *

AUTUMN PASTURE MANAGEMENT

TOPDRESSING for autumn and winter growth should be applied early (generally about February) before there is any marked change in the vigour of the pastures. On dairy farms and on sheep farms carrying high sheep concentrations up to 3 cwt of phosphatic fertiliser per acre may be applied, and in potash-deficient areas potassic superphosphate should be used.

Full use must be made of the growth resulting from autumn topdressing, but grazing should not be carried on too late into autumn or early winter, as this adversely affects early spring pasture growth. Supplementary feeding should be started early enough to allow some pastures to be carried through for late winter and early spring grazing. Consideration should be given to closing up some paddocks for this, and those selected should contain a well balanced sward of grasses and clovers. The time of closing will depend on district and climate. Decisions on autumn pasture management should be in relation to the season rather than conform to a rigid programme.

Oversowing of deteriorated pastures on dairy farms, which is more common in the North Island, should also be done in early autumn.

—*W. FAITHFUL, Invercargill*

* * *

HARVESTING LINSEED

UNDER favourable conditions direct heading is the best way to harvest linseed.

The crop is ready to head once the linseed bolls have dried off, when they shatter quite readily if pressed between finger and thumb. In a favourable season the colour of the straw is also a useful guide, the crop being ready to harvest when the stems have turned golden brown. In a damp season, however, the straw tends to retain its yellowness even after seed has matured, and an appreciable amount of second growth often adds to the difficulties of harvesting.

A crop to be direct headed must be left until fully mature; otherwise the bagged seed may sweat. Header harvesters can be fitted with linseed rollers through which the cut crop passes before entering the drum. This ensures shattering of the bolls and easier separation of seed.

A weedy crop or one in which there is second growth may have to be cut with the mower or binder, leaving a high stubble, and be threshed from the windrow.

—*W. V. HADFIELD, Christchurch*

* * *

OVERDRILLING OF PASTURES

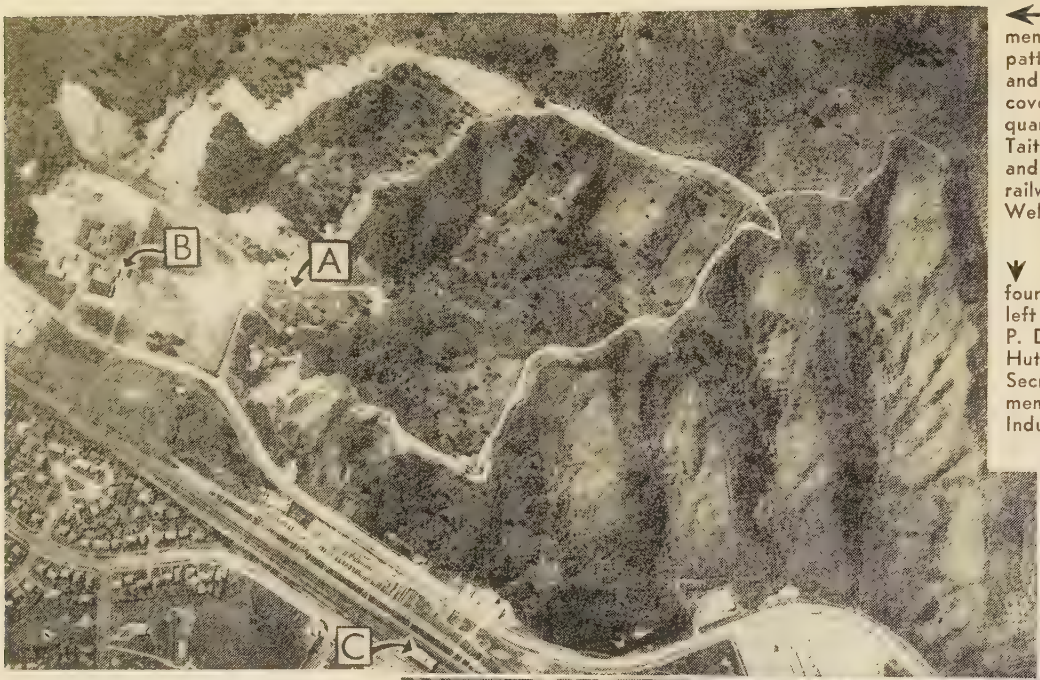
OVERDRILLING done under the right circumstances has proved very worth while and payable, but it can never replace pasture renewal for deteriorated swards where low fertility, grass grub, poor drainage, or poor grazing management are the underlying causes of failure. Free soils are the most suitable for overdrilling because penetration is more satisfactory.

Paddocks should be hard grazed (with sheep where practicable) to reduce competition from the sward to a minimum during the critical establishment stages of the introduced species. Sowing should be done as soon as the soil will allow good penetration and before autumn pasture recovery has begun. The introduced species must come away on the tide of autumn growth and dominate the pasture; otherwise they are likely to be strongly suppressed.

Overdrilling has usually given good results in clover-dominant pastures. The introduction of short-rotation ryegrass should be attempted only where the fertility is high. Prairie grass can also be introduced in this way, but not as successfully as when sown in a pasture mixture. Where the fertility is lower, perennial ryegrass should be the main species sown. The introduction of grasses, and sometimes clovers too, into pastures that have suffered severe losses of good species during a drought is also proving worth while.

—*L. W. BLACKMORE, Dannevirke*

New H.Q. for Soil Bureau on Taita Hill Area



← The Taita experimental station showing the pattern of catchment areas and types of vegetative cover. A—Site of headquarters buildings. B—Taita College buildings and grounds. C—Taita railway station on the Wellington - Upper Hutt - Wairarapa line.

↓ Official party at the foundation stone ceremony, left to right—Mr Nash, Mr P. Dowse, Mayor of Lower Hutt, Dr W. M. Hamilton, Secretary of the Department of Scientific and Industrial Research, and Mr Taylor.

THE foundation stone for a three-story block to provide laboratory and administrative accommodation for the staff of the Soil Bureau of the Department of Scientific and Industrial Research was laid toward the end of last year on a site on the 190 acres of eastern Hutt Valley hill country at Taita bought by the Government in 1949 as headquarters for the Bureau.

TYPICAL of hill country in this part of the Wellington district, and in the same soil group as about 11 million acres of New Zealand hill country, the area at Taita is being designed as an experimental station to investigate problems that confront soil workers, and in particular to study the effects on soil nutrients of types of vegetation and forms of management.

The basic design for work at Taita was indicated by the Director of the Soil Bureau, Mr N. H. Taylor, in his opening address to the Ninth Soil Survey Conference in 1957: "There is a feeling among leading soil men of the world that what is needed is a contained area of land wherein we can study the various processes operating and from which we can at the same time obtain some overall answer as an experimental check to the synthesis of the results of our separate studies. For this reason our Taita station is planned to be divided into catchments of the native forest, of exotic forest, and of grass. Within each we can study the various soil processes both *in situ* and by sampling, while a study of elements entering and leaving the catchment will give the integrating answer. The old idea of a soil-plant nutrient balance sheet, thought at one time to give the answer to fertiliser needs, was too simple a synthesis and gave disappointing results, but this problem, as well as many others, should yield to a well planned catchment technique."

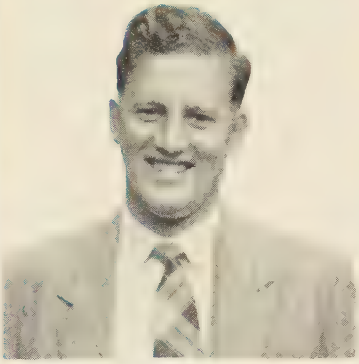
Paddocks at the Taita area form miniature catchments. Records will be kept of the elements arriving in the area through dusts and sea spray and of those leaving by the streams that drain it. Differences between the actual and estimated balance of nutrients so gained and lost are expected to provide the key to soil problems that need further study.

The most significant contribution the Soil Bureau had made to the development of the agricultural industry in New Zealand since its inception 30 years ago was referred to at the laying of the foundation stone of the new buildings by the then Prime Minister, Mr Nash. The scope and influence of the Bureau had grown immeasurably, said Mr Nash, and it was now concerned with many matters outside farming. It had grown out of the need to solve such problems as "bush sickness" in sheep and cattle and the then widespread abandonment of marginal land. The Bureau was designed not to solve problems on its own, but to supply information on soils to help other organisations to find practical answers. Fulfilment of its original role of taking stock of national soil resources by mapping and classifying had made available to advisory services information that had had a tremendous effect on the efficiency of farming.

Expansion of the Bureau's activities into the wider fields of soil engineering and soil biology had led to important work that helped toward the understanding of soil properties needed to carry highways and heavy buildings and in the construction of earth dams. As a result soil knowledge had become the basis of land use planning and was now an integral part of town and country planning, land valuation, and soil conservation and farm management advisory work.

150 Ewes Wintered on Saved Pasture and Hay on 25-acre Farmlet at Invermay

THE practice of saving pasture is most common on dairy farms, but in recent years more and more sheep farmers are recognising its worth and it could be one of the outstanding developments of recent years in sheep farm management. For the past four years 150 ewes have been successfully wintered entirely on saved pasture and hay on a 25-acre all-grass farmlet at Invermay Research Station. Saved grass can be used successfully on sheep farms to overcome the winter feed situation and to aid stock health. Through use of saved pasture less reliance need be placed on swedes and turnips and the acreage of these crops can be reduced. Efficient utilisation is very important and for this the three-wire electric fence offers great possibilities. Finally, this technique can be used without any major disruption to the general winter management programme and at a low cost.



N. A. CULLEN, Scientific Officer, Department of Agriculture Invermay Research Station, author of this article, which is adapted from a paper given at the Invermay Farmers' Conference.

AUTUMN-SAVED pasture consists of pasture shut up in late summer and early autumn and grazed off in winter and early spring. It is simply another method of conserving surplus herbage for winter use.

Probably greater use has not been made of this practice, largely because few sheep farmers have realised its possibilities. Most farmers in the south traditionally graze their pastures in late autumn and early winter before beginning winter feeding with hay and swedes. They have seen late winter growth on the grass paddocks cut back by frost and cannot imagine grass alone providing much in the way of feed.

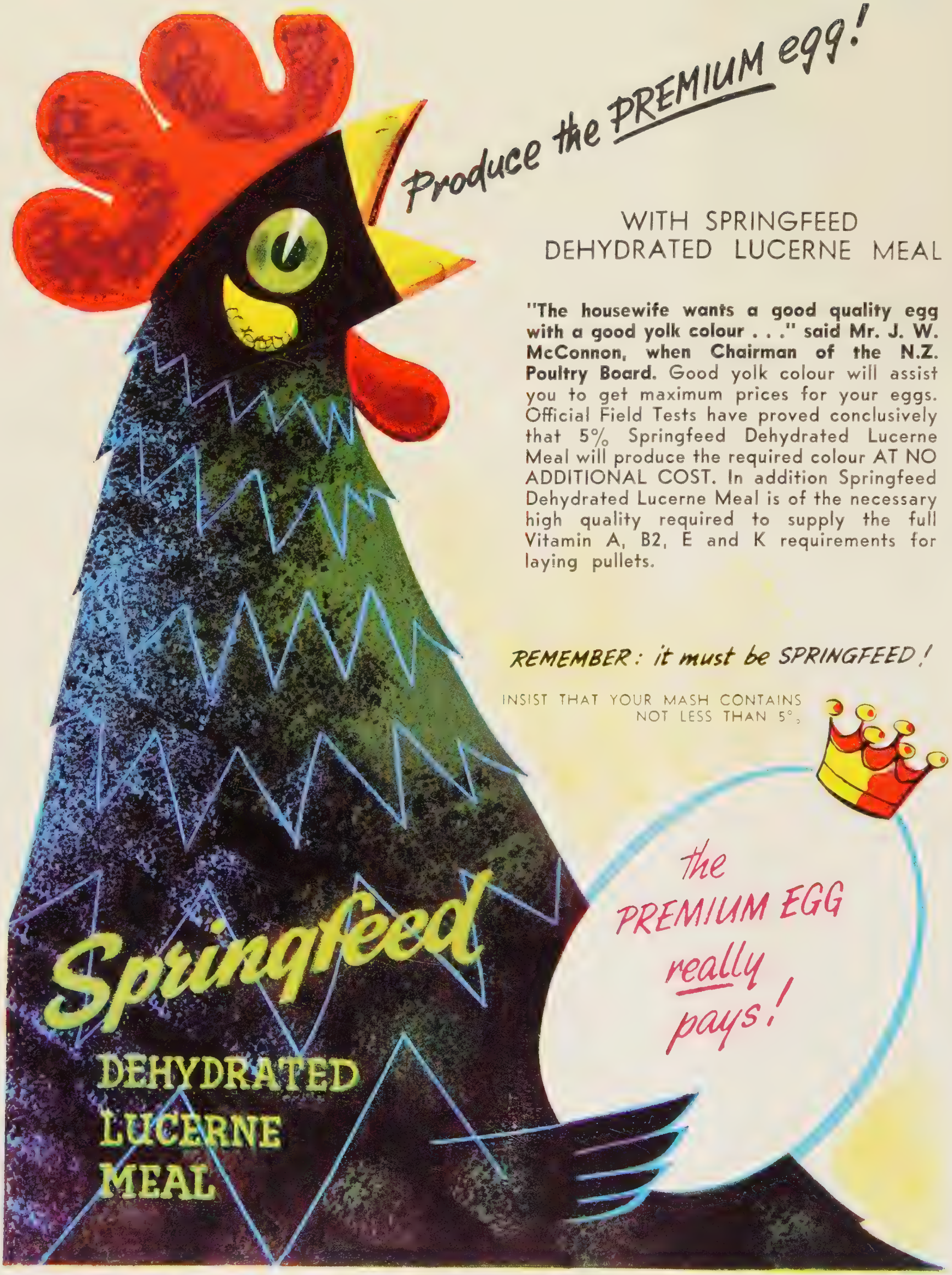
Sheep grazing fair-quality saved pasture in August.

Feeding off has been a problem: sheep trampling over a paddock of saved grass in frosty weather will rapidly spoil a high percentage of the herbage; hence break feeding is essential and really is the crux of the matter. Though most farmers are willing to shift netting fences on root crops every few weeks or so, they are not prepared to do the same thing on grass paddocks at more frequent intervals.

However, use of the electric fence partly solves this problem and undoubtedly it has contributed to the rapid increase in the use of saved grass in recent years.

Now, you may ask: "What is the point of going to all this trouble when I can winter quite satisfactorily with my present management?"

There are a number of reasons. Firstly, provision of extra feed for winter. This is of most importance in drought years or when root crops have been a total or partial failure. By using saved pasture a smaller acreage in roots may be required and less reliance is placed on them. Secondly, stock health is improved. Through use of saved grass, troubles such as pregnancy toxaemia (sleeping sickness) are almost eliminated and stock health and feeding generally are better. This is reflected in improved lambing percentages and increased wool weights. Thirdly, saved grass provides,



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Break feeding saved grass with a three-wire electric fence.

at negligible cost, palatable feed when it is most valuable. In other words pasture which is normally largely wasted in autumn is fully utilised.

Type of Pasture; Time of Closing

The best pastures for conserving are those consisting chiefly of perennial and short-rotation ryegrass, preferably the younger pastures. Pastures with a high percentage of clover, cocksfoot, and Yorkshire fog are best avoided, as these species are more susceptible to frost injury. Ryegrass remains green and succulent for several months without deterioration despite frosts up to 15 degrees, provided the herbage is several inches long.

Older perennial ryegrass pastures should be closed about the end of February to enable a good cover to be present before winter. Predominantly short-rotation ryegrass paddocks can be shut up about a month later—about the beginning of April. Short-rotation ryegrass will continue to grow throughout winter, and shutting up too early may result in over-long herbage. This is likely to lodge and become musty and unpalatable.

Management after Closing

With favourable autumn growth conditions the herbage may appear rather long at the beginning of winter and seem in need of grazing by cattle. However, it is best left alone, as grazing will only result in damage by trampling and much waste. At the beginning of winter the saved grass should be about 6 to 9 in. high and similar in appearance to dairy pastures or pastures closed for a light hay cut. Older pastures may be shorter, but are likely to be very dense and provide a surprising amount of grazing in later months.

Nitrogenous fertilisers such as ammonium nitrate-lime mixture or sulphate of ammonia are not generally recommended for topdressing because of their cost. However, they should be considered in times of feed shortage, as they will usually result in considerably more production and appear to make the pasture less susceptible to frost damage. For best results, nitrogenous fertilisers should be applied at closing or within a few weeks of that time. Generally the response is greater on short-rotation ryegrass pastures, which have the capacity for making good winter growth.

Frost Damage

Frost damage is not normally a serious problem, as autumn-saved pasture can stand a surprising amount of frost. The long, dense cover appears to act as an insulating layer and damage is consequently minimised. Damage is greatest in the early morning, when frost is still on the leaves, and it is wise to avoid grazing at this time.

Feeding off Time and Method

Saved pasture should be fed off in breaks and rationed according to the needs of the stock. As it is especially valuable in providing a green bite before lambing, it is advisable to begin feeding some six to eight weeks before lambing and ration it so that it will last the full period. Break feeding thus normally begins in July and continues throughout August, but where only a small area of saved pasture is available it is best kept for the few weeks before lambing.

The saved grass should be fed off in small breaks and grazed for a short period only each day—say one to two hours—so that trampling is minimised. We find at Invermay that shifting every three to four days is advisable so that fresh pasture is available. We have found that the least labour is needed if a three-wire electric fence is used. One man can easily shift a 5-chain stretch in less than half an hour without much effort. Considerably more time and effort are needed with netting fences.

Back fencing is advisable to allow the first grazed breaks to recover. If this is done, the first breaks are ready for a second grazing about a month later. Often a really amazing amount of recovery growth is made at this time, probably because the long spell in previous months has allowed the root reserves to build up.

How Much Feed Will Saved Pasture Provide?

At Invermay 1 acre of good saved grass used in conjunction with hay feeding lasts 150 ewes about a week. Thus for six weeks' grazing for 1,500 ewes about 60 acres would be needed. Less is required when swedes are also fed.

How to Fit Saved Grass into General Management

Saved grass can be used either as a supplement to swedes and hay for reducing lambing troubles or it can be the main source of winter feed. If it is to be used as a supplement, a relatively small area will suffice; if it is to be the main feed, a quarter to a third of the farm will have to be shut up and in addition two to three bales of hay will be needed per sheep wintered.

Because of the relatively large area of pasture spelled in autumn, only a limited area is likely to be available for flushing feed. However, flushing can be done on new pasture and on short-rotation ryegrass pastures, which can be closed after flushing. The remaining pasture should provide grazing during April and May, but hay feeding will generally be necessary about the end of May. At this time the sheep can be confined to one or two paddocks and maintained with hay alone.

This maintenance diet can be continued throughout June, but as ewes reach advanced pregnancy improved feeding is necessary and break feeding of the saved grass should be commenced early in July. Once break feeding starts hay consumption usually falls. The saved grass is fed off until lambing, when the sheep may be shifted to new grass and other spelled paddocks.

Effects on Pasture

Damage to pasture is usually slight unless conditions are very wet at the time of grazing. With old pastures which tend to be sodbound the spelling results in a general opening up and often improves the composition. If, however, the sward is allowed to become too rank and grazing is delayed until early spring, lodging may occur and then the resultant sward may be very thin in the next season. As porina damage can be severe on saved pasture, these areas should be treated with DDT before they are closed if there are any signs of these caterpillars.

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Farming in the Buller

AN increase in the land used for farming in the Buller district, which formerly relied mainly on gold and coal mining and timber milling, led the Department of Agriculture late in 1959 to carry out a survey of farming in an area centred on Westport. Because the survey showed that dairy farm production and profits were very low, the Department is now cooperating with a farmer near Westport in a demonstration to assess the economics of land improvement and to try to show how production can be increased on the better alluvial soils. The Department hopes that this demonstration may give some impetus to farming in the district. The results of the survey which led to this action are discussed in this article.

By H. H. TOCKER,
Farm Management Officer,
Department of Agriculture,
Christchurch

THE Buller region is composed mainly of a steep, mountainous range inland which has been dissected by many streams and rivers. The heavy rainfall plus the melting snow and ice from the many snowfields have caused severe flooding in these rivers. Consequently they have cut steep-sided valleys and gorges and spewed the debris out where they emerge at the base of the mountains, where the familiar fan-shaped plains have been built up to form the narrow coastal strip of agricultural land which is used for farming today. The parent materials of this land were granites, sandstones, mudstones, limestones, and schistose rocks.

Over the centuries earth disturbances have created uplifts in these fan-shaped plains of the coastal belt, resulting in a distinct step-like formation ranging from about the 500 ft level down to the present flood plains of the major rivers. Each step denotes an age in the geological formation—the highest the oldest, the lowest the most recent. Because the oldest and highest have been exposed to the longest weathering, they show the greatest leaching of soil constituents. These are the mature podzols, well known as the Westport "pakihis". The various stages of podzolisation are represented right down to the immature soils of the flood plains where farming is carried on today.

Some of the better soils of the Buller district are those of the flood plains; but much drainage work is still necessary before these soils can be developed for farming. This indicates the drainage problem on a farm on the flood plain three miles south-east of Westport.

These young alluvial soils are excellent dairying land but usually require drainage. Most of these soil types still need developing and are only partially farmed because of inadequate drainage. Where development has been completed good pastures exist, and if all of this land were developed to a similar standard, production could be substantially increased.

Near the coast lie extensive areas of consolidated sand country. This is good farm land when developed, but a very great proportion is still in gorse or undeveloped for want of drainage. Here the outfalls are impeded through wave action on this open, stormy coast building up dunes and sand and shingle ridges to impede the outflow of surplus water. Most of this scrubland could be readily developed if the drainage problem could be overcome.

Land Use

Data were collected from 75 farms in the area between Charleston and Seddonville embracing a total of 17,733 acres, which is about 90 per cent

constant research
and development
mean

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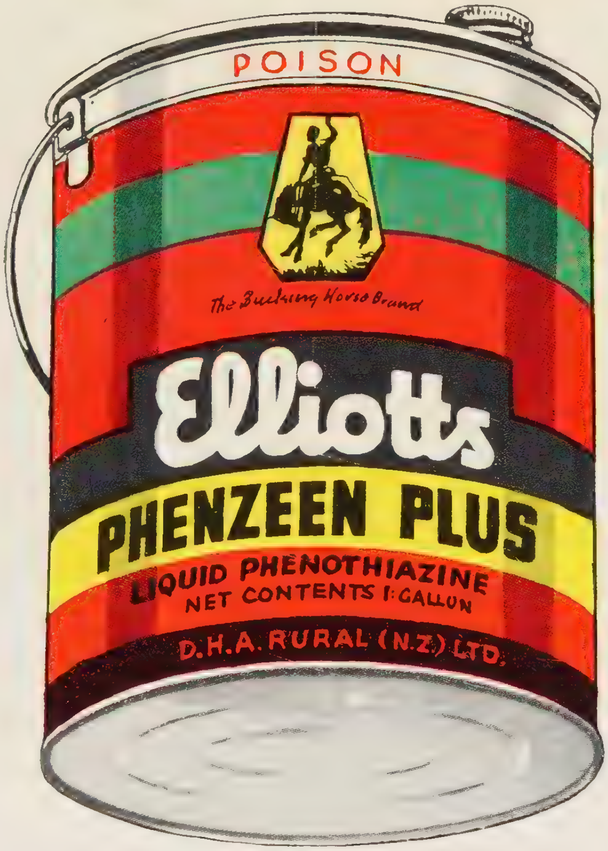

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Unimproved land on the flood → plain which can be developed into good pastures. This is on a property close to Westport.

of the farmable land in the area. This 17,733 acres was classified as 36 per cent alluvial flats, 23 per cent consolidated sand country, and 41 per cent terrace land. A proportion of the terrace land was pakihi, which contributed only some rough grazing for dry stock. The alluvial flats and sand country generally had a drainage problem which seriously hampered development, thereby limiting full utilisation of the area. Table 1 sets out the broad land use on the farms visited.

TABLE 1—LAND USE ON 75 FARMS IN BULLER

	Area acres	Per cent of total
Fallow, crop, and buildings	305	2
Swamp and pakihi ..	6,285	35
Pasture	6.768	38
Scrub and bush ..	4.375	25
	17,733	100

The problem areas of the West → Coast are known locally as "pakihi" lands. Underlying these soils at a depth of up to 2 ft are gravels packed with sand, the whole being cemented at different depths by layers of hard pan of varying thickness. This is an experimental area on the large block of "pakihi" between Westport and Charleston.

Farming Systems and Management

The Buller is favoured with a mild climate and a rainfall similar to parts of Taranaki, and, in common with that region, dairying is the main farming pursuit. However, the similarity ends there, for whereas land use in Taranaki is fairly intensive, much of the Buller is unproductive; in fact, on the average farm only about 40 per cent is fully utilised, as is shown in Table 2.

TABLE 2—LAND USE ON AVERAGE FARM

	Area acres	Per cent of total
Bush and scrub ..	58	24
Swamp	16	7
Pakihi	68	29
Crop	2	1
Pasture improved ..	40	17
Pasture unimproved	51	21
Buildings and fallow ..	2	1
	237	100

Very little of the 91 acres shown as in pasture was up to the standard expected on modern dairy farms. Usually weeds and low-producing pasture species were evident. On the average farm 40 acres were generously classed as improved grassland

Improved pastures on a property → on the flood plain alongside the Buller River.

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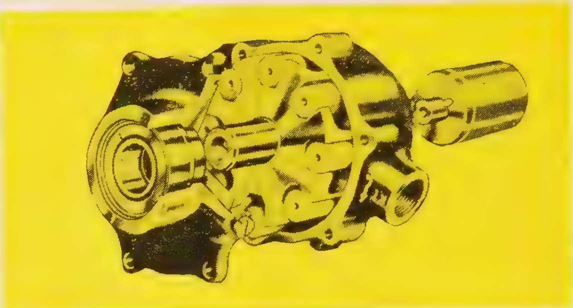

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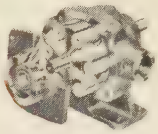

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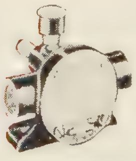

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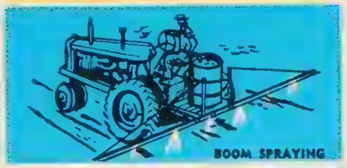

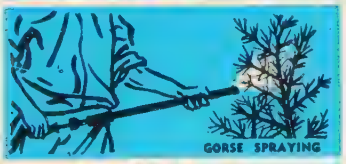

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while 51 acres was classed as unimproved pasture which had run out to rushes, willow weed, flat weeds, buttercup, pennyroyal, and sundry weed grasses. For the year of the survey only 22 of the 75 farms visited had sown new grass—an average of 8 acres per farm. Usually seed was broadcast through the manure distributor at 40 lb per acre. The most common practice in pasture renewal is to plough up a run-out pasture, work, and resow as soon as possible. Where a forage crop preceded the new grass much better results were obtained because the resultant seedbed was more suitable for grassing down.

Most farmers used superphosphate on their better grassland, usually 2 cwt per acre. For the survey farms 2,685 acres were topdressed—that is, almost all of the improved grassland. In addition, 46 acres received 1 cwt of potash per acre and 3 acres 1 cwt per acre of an ammonium nitrate-lime mixture. Liming was not universal practice, only 264 acres being treated at rates varying from 1 to 2½ tons per acre. Incidentally, most of the lime was applied to new grass areas before sowing down.

Stock Management

The majority of dairy farms were factory supply farms, with herds predominantly of Jersey or Jersey-cross cattle with some Ayrshires and Shorthorns. The town supply herds were mainly Friesian or Friesian-cross cattle with a sprinkling of Jerseys or Shorthorns.

For wintering, hay was the main supplement with some silage, autumn-saved grass, and a little crop. Only seven farms used hay, silage, and autumn-saved pasture; another four used hay and silage, and 11 relied solely on hay. Many farmers turned their cows out to graze on pakihi blocks or bush runs over winter.

Most farmers strip grazed with the electric fence during spring on either young grass or areas closed the previous autumn, but as soon as feed became plentiful herds were turned on to paddocks and shifted as required. Controlled grazing was not always possible, however, because of poor fences and inadequate subdivision.

Production

Of the 75 farms visited, 60 were engaged in dairying, a few producing whole milk for town supply. A total of 2,100 cows were milked and produced an estimated 516,390 lb of butterfat, an average of 246 lb per cow.

On the whole the town supply farms appeared better developed, more competently managed, and generally produced at a higher standard than the factory supply farms. On the factory supply farms production ranged from 2,500 to 14,000 lb of butterfat, whereas on the whole milk supply farms production ranged from 10,600 to 20,600 lb. (Whole milk was converted to butterfat at 4 per cent average fat content.)

It was estimated that the average number of cows run was 35, producing 8,607 lb of butterfat. On a per farm acre, this is 37 lb per acre. If the large proportion of disused land is ignored and the effective area only considered, production is 90 lb of butterfat per acre.

The production of pig meat was a valuable sideline on 46 factory supply farms. This is shown by the gross return from pig meat for these farms, which was £4,700, an average of £102 per farm. In terms of butterfat this meant that an additional 4⅓d. was received for every pound of butterfat produced on these farms.

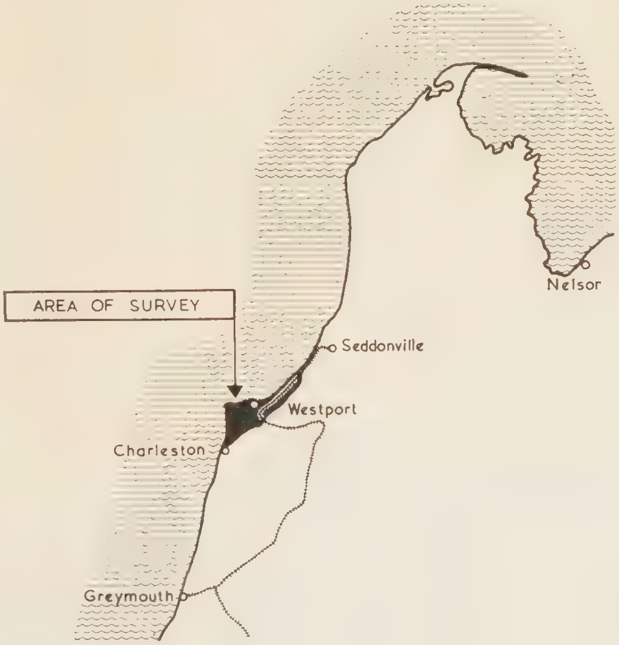
The average farm aimed at producing both baconers and porkers, though a few farmers specialised in producing weaners for sale. This practice accounted for the rather high sow/cow ratio of one sow to every nine cows milked. Usually, 1.5 litters per year were raised, the average survival rate being seven piglets per litter.

In addition to the dairying properties 15 farms produced either beef cattle or wool and fat lambs. These were not full-time properties and could be regarded more as sideline enterprises than farming units.

Other production noted was flax for twine making, which played a minor part on a small number of farms, and timber and silver pine posts for sale.

Finance

As the productivity of land is usually reflected in land values, an attempt was made to obtain valuations for as many of the survey properties as possible. Valuations were collected for 62 of the 75 farms visited, representing 14,779 acres or 83 per cent of the area investigated. The average investment in land and improvements for these 62 farms was £2,650, or a little over £11 per acre. If £1,250 is allowed for stock, based on the average herd of 35 cows plus replacements, and a further £1,200 for plant and machinery, including £350 as half the value of a car, the total average investment is £5,100 or about £21 10s. per acre.



Only 38 of the 75 farmers visited provided access to their financial affairs, but from this sample it has been possible to obtain some idea of the economics of farming in the area. The average gross income of these 38 farmers was £2,128, of which £1,700 was received from the sale of dairy produce. Running expenses, including interest payments (£113), and depreciation (£217), were £1,428, leaving a surplus of £700. This is the amount remaining to the farmer as a reward for his management and from which he must pay taxation, living expenses, and costs of developing his property.

Another method of measuring the profitability of farming in the area is to assess the return on the value of the investment. This was done on the following basis.

	£	£
Average cash income of farms ..		2,128
Plus the value of the increase in livestock at end of year compared with beginning of year		60
Average gross income		2,188
Less average farm running expenses, including depreciation but excluding interest payments on mortgages ..	1,315	
Less wages to owner assessed at £11 per week and a management reward assessed at 10 per cent of gross income	789	2,104
Interest surplus		84

This interest surplus of £84 gives a return of a little over 1½ per cent on the value of the investment, which is a low return.

The return on the value of the investment was also examined by dividing the 38 farms into two groups. Group A comprised 22 farms where the annual production was below 10,000 lb of butterfat, and Group B 16 farms where the annual production exceeded 10,000 lb of butterfat.

TABLE 3—AVERAGE RETURNS ON VALUE OF INVESTMENT ON TWO GROUPS OF FARMS

	Per cent
Group A (under 10,000 lb butterfat) ..	—7
Group B (over 10,000 lb butterfat) ..	+7

The farms in Group A would be classed as uneconomic, the farmers having either to work part time off the farm or accept a low standard of living.

Production Potential

In any investigation aimed at measuring present and potential production there arises the difficulty of fixing standards by which to measure land capabilities. Of the estimated 19,000 acres suitable for intensive farming, only a very small part is at present farmed to anything like capacity; hence the difficulty of awarding a standard by which this land can be given a potential.

It was considered that the alluvial soils of the river flats and the consolidated sands along the coast when fully developed should carry one dairy cow to every 2 acres. An average production of 300 lb of butterfat per cow gives a production of about 150 lb per acre.

If such production is achieved, the present district output of about 310 tons of butter should increase to 1,000 tons. Associated with this increase would be the production of more pig meat, bobby calves, and cull dairy cattle. It is also likely that some land would be used for fat lamb and wool in preference to dairying.

However, before there can be any major increases in production much drainage and development work will be necessary, and consequently additional capital will be required.

Farm Improvement Demonstration

The survey showed that the per acre production and the net returns being obtained by dairy farmers in the Buller are very low. In an endeavour to demonstrate what can be achieved on the better alluvial soils, and to assess the economics of land improvement work, the Department is now cooperating in a farm demonstration with a farmer close to Westport. The farm is of 120 acres, of which 40 acres is in fern, scrub, and bush, 15 acres is in swamp, and the balance is run-out pasture. A 5-year improvement programme has been drawn up with the farmer, including drainage and land clearing work, establishment of good pasture, and the erection of extra subdivisional fencing. As stated before, the Department hopes that this demonstration may give some impetus to farming in the district.

Acknowledgments

Assistance of farmers and accountants in the Buller district is acknowledged; also Soil Survey Westport District, by C. S. Harris and A. C. Harris, and Land Utilisation Survey of West Coast Region, by Litt.

Radio Broadcasts for Farmers

RADIO broadcasts for farmers will be given in March as follows:

4YA Dunedin and 4YZ Invercargill, 12.36 p.m.

6 March—"The Feeding and Management of Laying Pullets", by M. E. Sutton, Poultry Instructor, Department of Agriculture, Dunedin.

13 March—"New Advances in Inoculation", by G. M. Bennett, Farm Advisory Officer, Department of Agriculture, Invercargill.

20 March—"Tb Testing", by C. E. Isaacs, Veterinarian, Department of Agriculture, Invercargill.

27 March—"Pasture Trials", by S. M. J. Stockdill, Fields Instructor, Department of Agriculture, Palmerston.

2XP New Plymouth, 8 p.m.

2 March—"News and Views from the Farm Advisory Division", by S. H. Henry, Farm Advisory Officer, Department of Agriculture, Stratford.

16 March—"Rearing Hoggets to Two-tooths", by G. B. Moore, Livestock Instructor, Department of Agriculture, New Plymouth.

23 March—"Radio Vet.", by J. H. Macdonald, Veterinarian, Department of Agriculture, New Plymouth.

1YZ Rotorua, 7.15 p.m.

1 March—"Fertility in the Home Orchard", by B. M. Piper, Horticultural Instructor, Department of Agriculture, Tauranga.

15 March—"Tuberculosis and Progress in its Eradication", by J. W. F. Mackintosh, Veterinarian, Department of Agriculture, Rotorua.

29 March—"Pasture Renovation in the Rotorua District", by C. R. Taylor, Instructor in Agriculture, Department of Agriculture, Rotorua.

1XH Hamilton, 12.33 p.m.

13 March—"Hill Country Pasture Improvement", by J. D. Currie, Farm Advisory Officer, Department of Agriculture, Hamilton.

20 March—"Soil Preparation for Garden Crops", by E. Toleman, Horticultural Instructor, Department of Agriculture, Hamilton.

27 March—"Wintering Pigs", by J. R. Tocker, Livestock Instructor, Department of Agriculture, Hamilton.

Regular Sessions

1YA Auckland, Mondays at 12.36 p.m. ("Country Journal", including "Report from Ruakura"), Tuesdays, Wednesdays, Thursdays, and Fridays at 12.33 p.m. ("Country Journal"), Thursdays at 12.33 p.m. ("News for the Farmer").

1XN Whangarei, Mondays at 8 p.m. ("Northland Stock Market Report", followed by "Farming for Profit"), Wednesdays at 8 p.m. ("Farming for Profit"), and Fridays at 12.33 p.m. ("Farm News").

1XH Hamilton, Mondays at 12.36 p.m. ("For the Farmer", excluding first Monday in month and public holidays), Wednesdays at 12.33 p.m. ("Report from Ruakura").

1YZ Rotorua, Wednesdays at 7 p.m. ("Bay of Plenty Journal"), Thursdays, 12.33 p.m. ("News for the Farmer").

2YZ Napier, Tuesdays at 7.10 p.m. ("The Hawke's Bay Farmer") and Thursdays at 12.33 p.m. ("News for the Farmer").

2XG Gisborne, Tuesdays at 8 p.m. ("Farm Session").

2XP New Plymouth, Thursdays at 8 p.m. ("Farm Session").

2XA Wanganui, Mondays at 8 p.m. ("For the Man on the Land"), Tuesdays at 8 p.m. ("Farm Supplement"), and Thursdays at 8 p.m. ("Farm Topics").

2XB Masterton, Fridays at 6.45 p.m. ("Farm Session").

2XN Nelson, Thursdays at 8 p.m. ("Nelson Farm Topics").

2ZA Palmerston North, Mondays at 12.36 p.m. ("Country Digest"), and Fridays at 8.30 p.m. ("Country Digest", including Feilding stock market report).

2YA Wellington, Mondays, Tuesdays, and Fridays at 7.10 p.m. ("Farm Session"), Thursdays at 12.33 p.m. ("News for the Farmer").

3YA Christchurch, Mondays at 12.20 p.m. ("Country Session"), Thursdays at 12.33 p.m. ("News for the Farmer"), and 7.10 p.m. ("Home Paddock").

3XC Timaru, Wednesdays at 8 p.m. ("Farmers' Weekly News Service"), and Saturdays at 10.30 a.m. ("Country Mailbag").

3YZ Greymouth, Mondays at 12.36 p.m. Thursdays at 12.33 p.m. ("News for the Farmer").

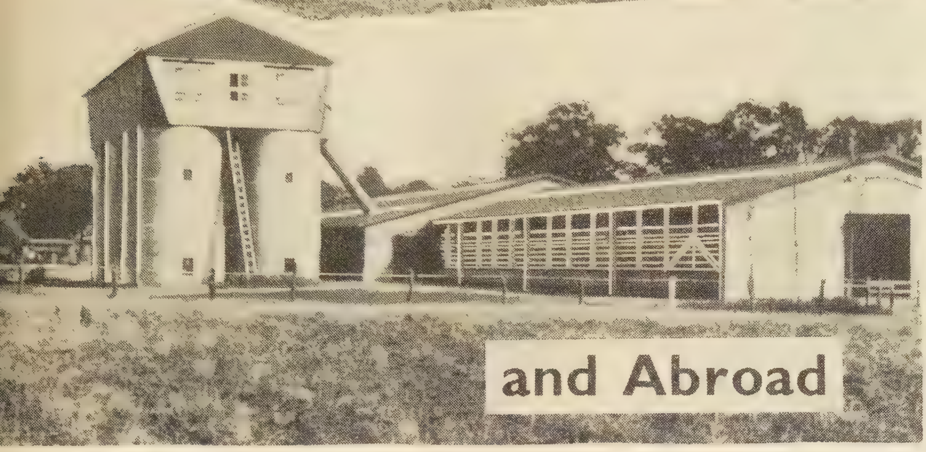
4YA Dunedin, Mondays at 12.36 p.m., Wednesdays and Thursdays at 12.33 p.m.

4YZ Invercargill, Mondays at 12.36 p.m., Wednesdays at 12.33 p.m., and Thursdays at 12.33 p.m. ("News for the Farmer").

SILAGE in New Zealand and Abroad

SELF-FED SILAGE

← An experiment at Ruakura's No. 5 Dairy to compare, with two herds of 20 identical twins each, systems of wintering dairy cows (1) with, after June, an all-grass diet of pasture saved through early feeding of silage and (2) with feeding silage after mid June.



← A battery of eight tower silos in Kiel, Western Germany. The elevator is between the two front silos and the chute for conveying silage to the cows is on the right.

THE same basic principles apply to silage making in a wedge, a 60 ft tower, or a preserving jar, and these principles must be firmly established so that efficient equipment can be developed and farmers can have specific objectives, states R. J. Lancaster, Principal Scientific Officer, Department of Agriculture Ruakura Animal Research Station, Hamilton, in a paper presented at the 1960 Ruakura Farmers' Conference Week. From a study of overseas methods of research into silage making during a recent tour he concludes that modern research has returned to fundamentals, which is desirable because of the large capital invested in harvesting equipment and silos. This article, which is an adaptation of the paper, summarises conclusions resulting from study of research findings overseas and in New Zealand and gives some general observations on practical developments in the field.

SILAGE making can be narrowed to three basic issues. First and most important is the influence of ensiled crop. Second is the role of consolidation and aeration. Third is the role of temperature.

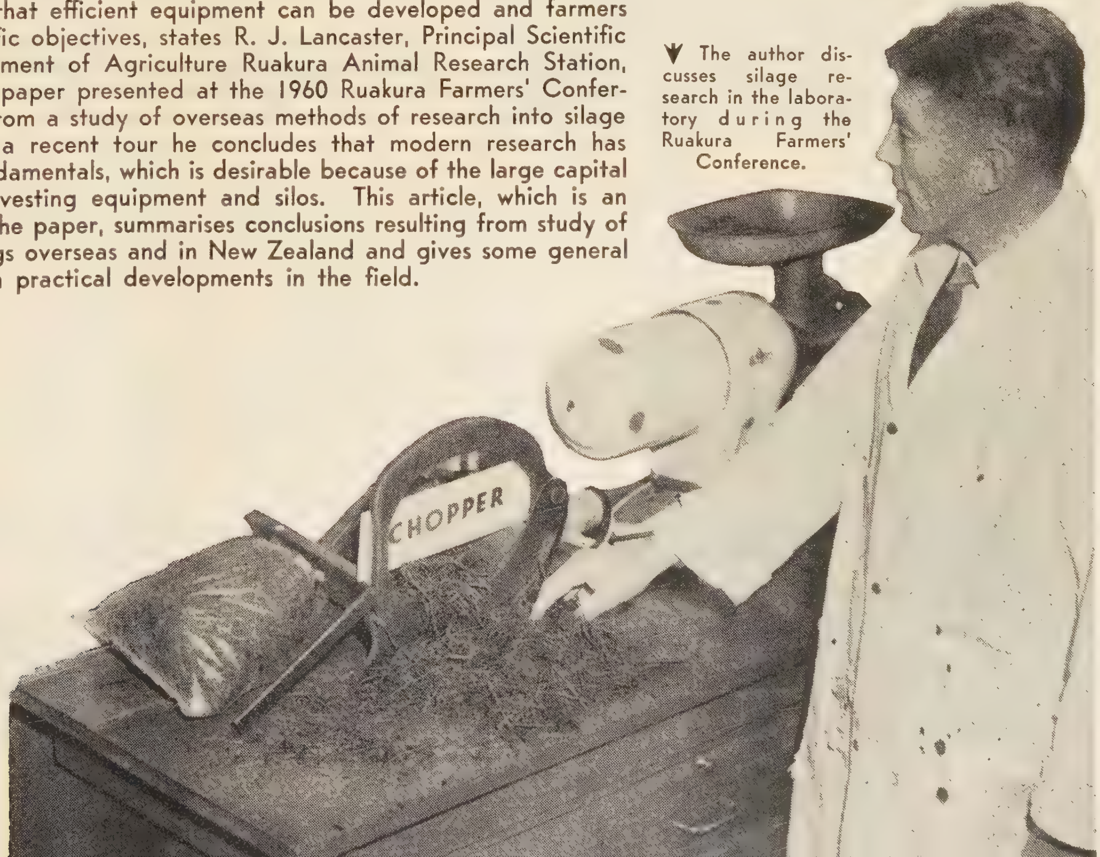
It would be rather pointless to discuss current research and practice without considering these issues, since they influence everything that is done.

The natural silage fermentation is a lactic acid producer and lactic acid is the preservative which prevents undesirably degrading fermentations from developing. The production of lactic acid is all important and is governed by the three factors mentioned.

Best Temperature

The optimum temperature for silage making has been debated for many years, but evidence on the question is fairly clear cut. In the late 1920s German research demonstrated that

↓ The author discusses silage research in the laboratory during the Ruakura Farmers' Conference.



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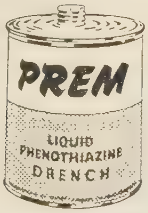

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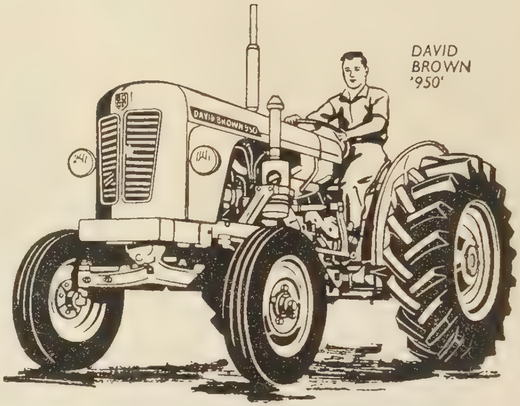

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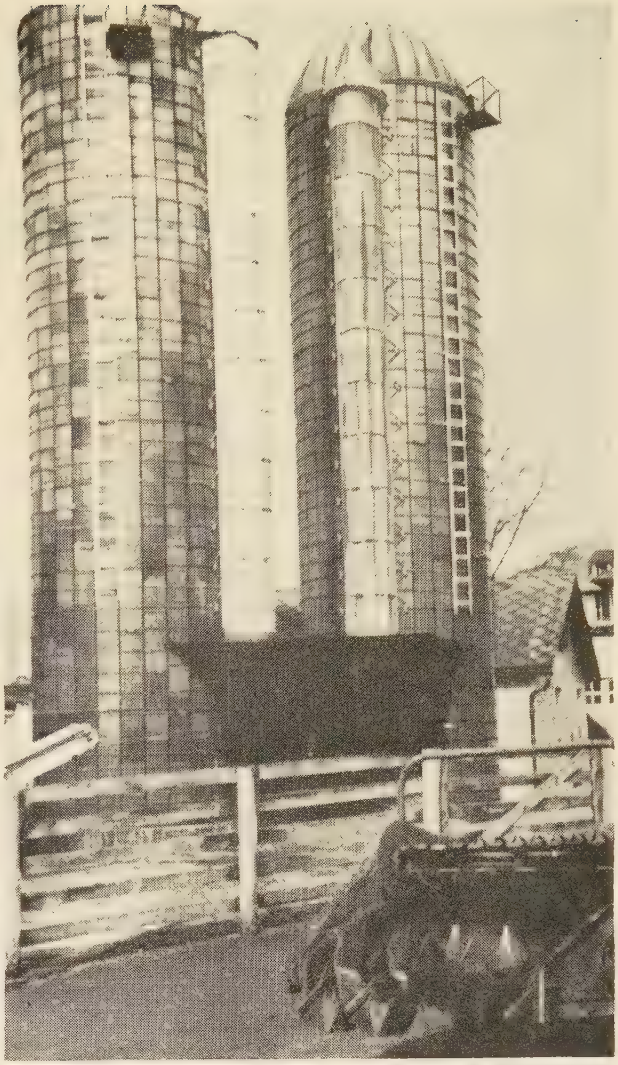
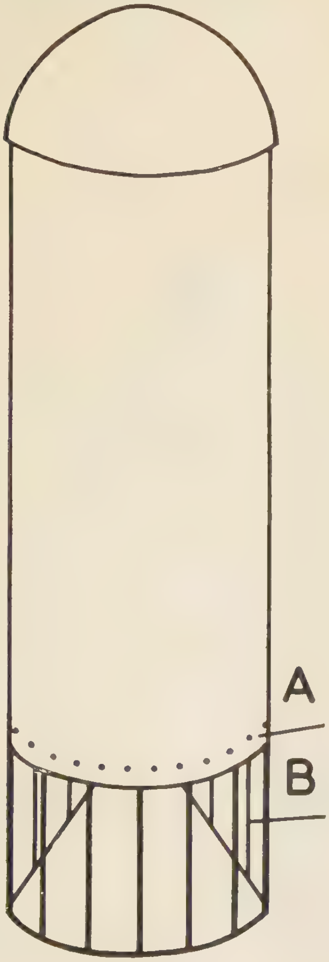
below 80 degrees F lactic acid is the main fermentation product, but that above this, butyric acid and other undesirable fermentations could compete successfully with lactic acid. Above 120 degrees F bacterial activity, with the exception of that of certain heat resistant lactic acid bacteria, declines. On the basis of these findings it was recommended that silage be held below 80 degrees F, or if this was not possible, that it be allowed to heat rapidly to more than 120 degrees F. Though this hot silage was well known as a pleasant smelling and palatable feed, it is now recognised that high temperatures are achieved at great expense of nutrients and the method is no longer generally advocated, though no doubt it is often used.

Recent Swedish experiments fully confirm the German findings and establish conclusively that lactic acid can be produced successfully at temperatures as low as 40 degrees F, which is not very far removed from freezing point, while butyric acid production declines substantially below about 80 degrees F. The conclusion seems warranted that if there is an optimum silage fermentation temperature, it is below 80 degrees F.

This issue is complicated by consideration of the role of consolidation and aeration in the silage process. As a result of their studies at Jeallotts Hill in England S. J. Watson and his co-workers concluded that freshly ensiled material should be kept slightly aerated during the initial stages to promote the desired fermentation and inhibit the undesirable ones. It was suggested that optimum aeration could be obtained by so controlling the rate of ensiling and consolidation that the temperature is held in the range 80 to 100 degrees F. This recommendation forms the basis of silage making in the United Kingdom and in New Zealand today.



Tower silos of → glazed tiles at Pennsylvania State College, U.S.A.



← A self-feed tower silo in U.S.A. Sections removed from the bottom, showing steel stilts (B). Cows feed from the exposed face. More silage is obtained by withdrawing some of the steel pins (A). The cone throws silage to the outside edge of the silo.

Factors for Success

The results of Ruakura studies, of investigations recently published in Australia, Canada, and U.S.A., and of work in progress in England indicate that this method is unsound and unsatisfactory. The following specific points may be noted.

1. The onset of lactic or butyric fermentations does not appear to be influenced by consolidation or aeration. Whatever the conditions, lactic acid appears soon after ensiling, but there is often a delay of some days before butyric acid appears.
2. Most of the heating of grass is at the expense of sugars which are required for lactic acid production.
3. The better the air exclusion is the better the silage will be chemically and nutritionally and the lower the losses will be. These points indicate that optimum ensiling conditions are achieved by rapid ensiling, rapid consolidation, and low ensiling temperatures. This conclusion will immediately raise the question: Why does cold fermentation so often produce sour silage? This, in turn, introduces the first basic issue cited, the influence of ensiled material.

Influence of Material Used

Excellent silage can be made at the usually recommended temperatures (80 to 100 degrees F) if the ensiled material is good enough; that is, if it contains sufficient sugar to heat itself

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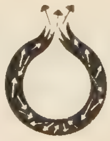

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to the desired temperature and to produce the required amount of lactic acid. If the material is marginal (that is, contains just sufficient sugars for lactic acid production), there will be none available for heating, and aeration becomes a critical factor, warm fermentation yielding a sour silage and cold fermentation a good one. Finally, if the material is submarginal (that is, contains insufficient sugar for the required lactic acid production), a sour silage results whatever the degree of aeration.

Examples of these three cases can be found in the results of research work already cited. The situation is more complicated than suggested here. One complicating factor is the water content of ensiled herbage. The higher the water content is the greater will be the amount of lactic acid necessary to preserve the silage. Leafy herbage growing rapidly under high moisture and good fertility conditions often contains relatively low sugar and/or high water concentration, and is hence a poor ensiling bet. This is just the type of material which compacts readily and fails to heat. The association of cold fermentation with sour silage can therefore be more satisfactorily explained in terms of the ensiled crop rather than the method of ensiling. Furthermore, it follows from what has been said that a cold fermentation is not necessarily a guarantee of successful silage. The quality of the ensiled material is the important factor.

Overseas Research

Much current and recent research overseas concerns the points raised. The British research workers' views agreed substantially with those presented here, though there were divergent opinions. These workers were cautious in the interpretation of results, and reserved the possibility that certain theories may ultimately be substantiated, and they supported the warm fermentation hypothesis. They did not, therefore, recommend any changes in present ensiling methods. The advisory officers and farmers were solidly in favour of retaining the present methods.

Field Developments

Though the main purpose of the tour was to study research methods, particularly in silage making, some time was spent in studying practical developments in the field. The sample of farms visited was a small one and would by no means represent British practices, so that a valid statement of methods generally used is not possible.

In Britain and especially in Scandinavia the attitude to the ensiled crop differed from what I believe it to be here. In New Zealand silage is regarded as a means of conserving excess spring grass and sufficient is made to carry the herd through perhaps three months. In Britain the silage feeding period is more like six months, and in Scandinavia eight months. Special crops are often used for this, and the ley-type farming assists in providing these crops. A high proportion of Italian or short-rotation ryegrass was included in bringing an area back into pasture. These provide excellent material for silage making.

The trends of harvesting methods in Britain are similar to those in New Zealand, and it is difficult to decide who is following whom. The advantages of laceration appear to have been shown first by Dutch workers, and the Dutch still possibly retain the initiative in developing new equipment which includes crushing and mincing devices.

As a rough estimate it seems that about a third of the silage harvest in Britain is cut and transported with a lacerating machine-trailer combina-

An electric-powered silage cutter on an East Lothian farm, Scotland.

▼ Glass-lined steel silos at Pennsylvania State College, U.S.A. They are completely gas tight and are emptied at the bottom by a mechanical chain device.

tion. The grass is frequently transported to the pit in this way, but is finally placed in the pit by a buckrake operating between the pit and nearby dump. The sickle bar mower and buckrake still handle over half the silage crop.

One of the claims made for flail-type harvesters is that they hasten the desired fermentation by releasing plant juices and increasing consolidation. Full advantage cannot be taken of this if filling and consolidation rates are slowed to allow for heat development, which is a common practice in Britain. On the other hand, a commercial group in England was experimenting with vacuum silage, the vacuum being achieved by enclosing the material in a plastic silo and evacuating the air. On theoretical grounds this seems ideal, but obviously the method is the direct antithesis of accepted theory and practice in Britain.

Self-feeding systems are arousing considerable interest in most silage localities. No active self feeding was seen, but a number of self-feed set ups were studied. The main labour requirement with self feeding seems to be for the removal of dung from the feeding platform. The British farmer probably has an advantage over us in this respect, since he is generally geared for mechanical muck moving, and the maintenance of the feeding platform requires little organising.

One or two criticisms of self feeding generally are worth mentioning. Silos for self feeding must necessarily be restricted to 5 to 6 ft in height; hence the tendency to build large, shallow, bunker-type silos, which result in maximum exposure of ensiled material to damage due to aeration during filling. Such silos are costly to cover or, if sited in buildings, require large roofing areas.

Furthermore, cattle have difficulty in tearing material from the face of heavily consolidated silage, and for successful self feeding it has been suggested that care must be taken to minimise consolidation. Requirements for self-feed silage making are therefore in conflict with the views already expressed, which imply maximum consolidation.

In Britain, as in New Zealand, the simple wedge or some variant of it is probably the commonest type of silo.

Above-ground bunker silos using sod or earth walls, wood, railway sleepers, and concrete are gaining popularity, particularly for self feeding. The bunker silos are frequently built into the cow byre and the material is self fed from the ends or sides according to local conditions.

◆

Fruit Crop Estimates for 1960-61 Season

THE following estimates made in December of the fruit crop for the 1960-61 season are in 000's of bushel cases. They are summarised from information supplied by field officers of the Horticulture Division of the Department of Agriculture. Districts producing less than 500 bushels of a variety are not shown, but are included in totals. District totals of more than 500 are rounded to the nearest 1,000.

FRUIT	DISTRICT								
	Auckland Province except Gisborne	Gisborne	Hawke's Bay	Wellington and Taranaki Provinces	Nelson Province	Marlborough	Canterbury and North Otago	Central Otago	Total 000 bushels
APPLES—									
Ballarat	73	4	80	3	6	9	11	1	187
Cox's Orange Pippin	12	2	78	4	140	13	18	15	282
Delicious	19	8	100	3	244	34	26	60	494
Dougherty	13	4	75	—	37	2	—	—	131
Granny Smith	149	8	232	8	129	4	3	7	540
Gravenstein	26	—	28	—	93	2	2	3	154
Golden Delicious	21	1	61	1	112	6	12	8	222
Jonathan	11	—	52	3	333	38	21	29	487
Sturmer Pippin	9	6	255	19	463	39	74	44	909
Others	85	5	165	11	109	15	51	42	483
Total	418	38	1,126	52	1,666	162	218	209	3,889
PEARS—									
Beurre Bosc	3	—	5	—	11	—	1	—	20
Louise Bonne de Jersey	1	—	30	—	1	—	—	1	33
Packham's Triumph	16	—	15	—	16	—	—	—	47
P. Barry	8	1	23	—	7	—	2	—	41
W. B. Chretien	24	1	122	1	83	1	7	15	254
Winter Cole	2	1	105	1	65	2	9	10	195
Winter Nelis	—	1	66	—	11	—	2	16	96
Others	22	1	10	1	16	1	9	7	67
Total	76	5	376	3	210	4	30	49	753
Quinces	8	1	7	1	2	—	1	—	20
STONE FRUIT—									
Apricots	1	1	7	—	—	—	15	171	195
Cherries	—	—	1	—	—	3	1	11	16
Nectarines	2	2	17	—	1	—	2	31	55
Peaches	81	15	412	2	48	8	8	115	689
Plums, European	—	—	7	—	2	—	2	19	30
Plums, Japanese	40	2	76	1	6	1	9	12	147
Total	124	20	520	3	57	12	37	359	1,132
BERRY FRUITS—				Total in tons					
Boysenberries	6	2	15	5	19	—	4	7	58
Currants, Black	—	—	1	24	6	—	54	—	85
Gooseberries	—	—	2	125	3	—	8	—	138
Loganberries	1	2	1	10	1	—	18	—	33
Raspberries	5	2	32	125	293	3	425	47	932
Strawberries	425	14	50	175	12	2	164	120	962
Total	437	20	101	464	334	5	673	174	2,208
Walnuts	—	8	45	3	2	40	50	5	153

South Island Soil Testing Station Established at Taieri

THE Department of Agriculture has established a South Island Soil Testing Station at Taieri, where it will become a unit of the Department's new Taieri Agricultural Centre. Soil testing in the South Island has previously been done as part of the work of the Department's Winchmore Irrigation Research Station, near Ashburton.

The new Agricultural Centre will be set up when the Veterinary Diagnostic Station, which is at present being converted from buildings vacated by the RNZAF at Taieri airport, is ready for occupation by staff. This is expected to be either late this month or early in March.

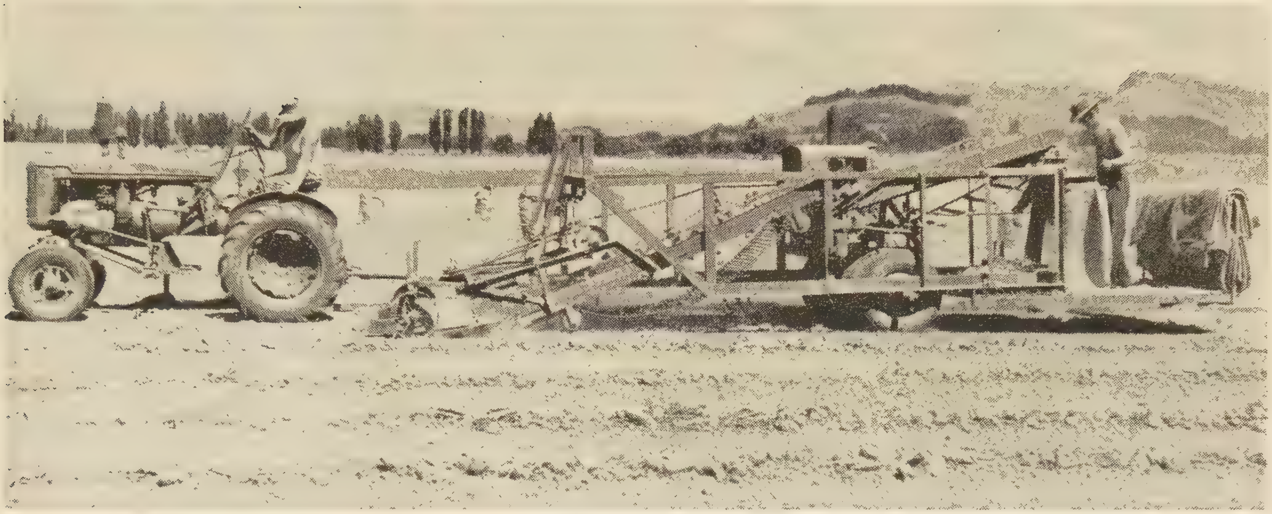
The third unit comprising the Centre is the Department's Invermay Research Station, which practically adjoins the airport and is 1½ miles from Mosgiel.

◆

Vegetable Growing for

Home and Commercial Gardeners

By A. G. KENNELLY,
Horticultural Instructor,
Department of Agriculture,
Dunedin



[*R. W. Orr*

Harvesting a commercial crop of onions in Hawkes' Bay.

Onions

THE onion is a temperate climate crop fairly hardy to frost but less sensitive to heat than lettuce. Wet weather as the crop reaches maturity results in poor curing, inferior keeping quality, a higher than usual percentage of thick necks, and often in re-rooting. Length of day and temperature have an important bearing on bulb formation and on premature formation of seed stalks. Low temperatures and short days force plants to seed formation, though some varieties succeed in much shorter days than others.

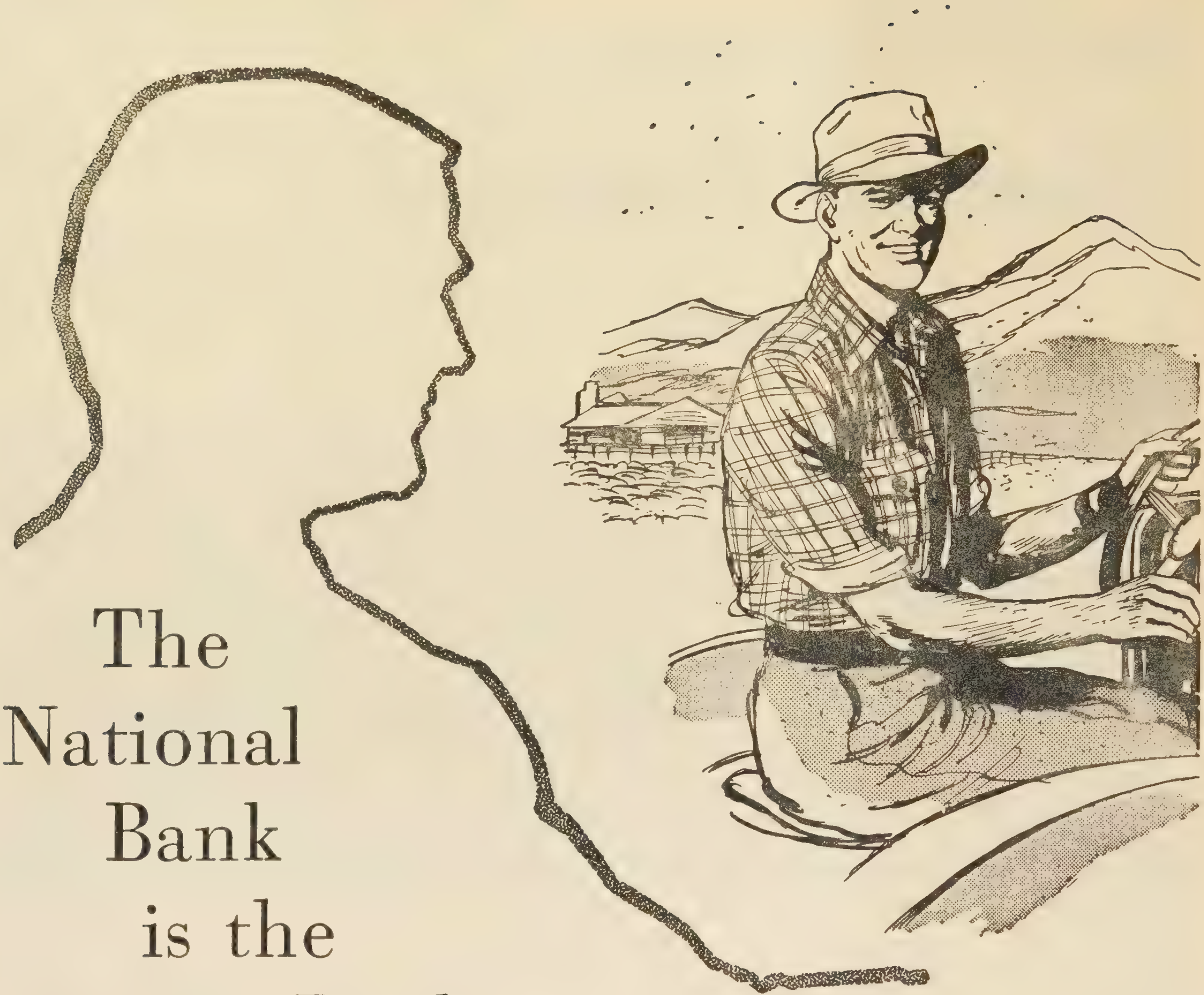
VARIETIES and cultural practices have an important bearing on production, but fairly heavy soils generally produce good-keeping but relatively slow-maturing onions, and sandy soils produce thinner-skinned, quick-maturing onions that generally are of poorer keeping quality. Onions are gross feeders and do best on soils rich in organic matter. The plant food should be readily available, but in such a form and in such quantities that it does not cause root damage. The root system is not wide spreading, but the onion is less sensitive to drought than celery or lettuce.

The onion forms two distinct root systems. The first develops at the time of germination of the seed and functions until the formation of the bulb. It arises from the centre of the stem plate and tends to die early and is replaced by new roots from the margin of the stem plate. The roots are fine but very numerous and radiate in all directions and form a fibrous tuft which usually penetrates about 6 to 8 in. and rarely more than 20 in. deep.

In loose sandy or peat soils onion bulbs may be grown thickly in the rows without being deformed, but in the heavier soils the bulbs may become flat sided if they are crowded in the rows. The type of soil and nutrition have a marked effect on date of maturity and percentage of mature bulbs. Onions mature earlier on light sandy or peaty soils than on heavier soils, and very acid or alkaline soils slow growth and delay maturity.

Manuring

Fertiliser practices vary somewhat throughout New Zealand, but fertiliser generally is applied on a moderate to a fairly heavy scale. Generally the soil is maintained in a good state of fertility by heavy dressings of organic manure each year. Blood and bone at 10 cwt to 15 cwt to the acre with or without potash is applied by many growers. (The table on page 139 gives the principal manurial practices in various districts.)



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Common District Practices in Growing of Onions and Related Crops

The following table sets out in brief common district practices

ONIONS

	AUCKLAND (Few grown)	PUKEKOHE	PALMERSTON NORTH	HASTINGS	NELSON	CHRISTCHURCH	DUNEDIN (Few grown)
Sowing (field)	Aug.-Sept.	Mid July-Aug.	Aug.	Aug.-Sept.	*	Sept.	Sept.
Main varieties	Pukekohe Long Keeper	Pukekohe Long Keeper American Hybrid	Pukekohe Long Keeper	Pukekohe Long Keeper Straw and Brown Spanish Ailsa Craig Giant Rocca Early Golden Globe	Pukekohe Long Keeper Globe Straw Spanish Californian Red	Pukekohe Long Keeper Turbot Rangitikei Red	Pukekohe Long Keeper
Main methods of weed control	CIPC	In weedy areas: Pre- and post-emergence CIPC or sulphuric acid; or kerosene pre-emergence. Sulphuric acid after hook stage. At 4 in. high (3-4 leaves): CIPC at 4 lb (1 gal.) per acre	Sulphuric acid and/or CIPC when large	Sulphuric acid (rarely)	*	Sulphuric acid pre- and post-emergence. CIPC pre-emergence (4 lb per acre)	
Fertilisers commonly used	Base dressing: 3 cwt blood and bone, 8 cwt bonedust, 8 cwt super., 1 cwt sulph. potash Side dressing: 3-4 cwt ammonium nitrate-lime or sulphate ammonia	10 cwt bonedust (usually before sowing), 5 cwt super., 3 cwt sulph. potash, 2 cwt dried blood per acre		Blood and bone, 2 : 2 : 1 orch. mix. at 4-10 cwt per acre	2 cwt super., 2 cwt blood and bone, 1 cwt potash per acre	4-6 cwt super. per acre. Organic manure or follows crop well manured with bulky organics	Blood and bone up to 15 cwt and/or 6-8 cwt of mixture containing nitrogen, phosphorus, and potash
Main pests and diseases	Thrips, downy mildew	Thrips, downy mildew	Thrips, cutworm, mildew	Thrips, eelworm, onion fly, downy mildew, grey mould, yellow dwarf	Thrips, downy mildew	Thrips, white rot, smut, downy mildew, yellow dwarf	Thrips, downy mildew

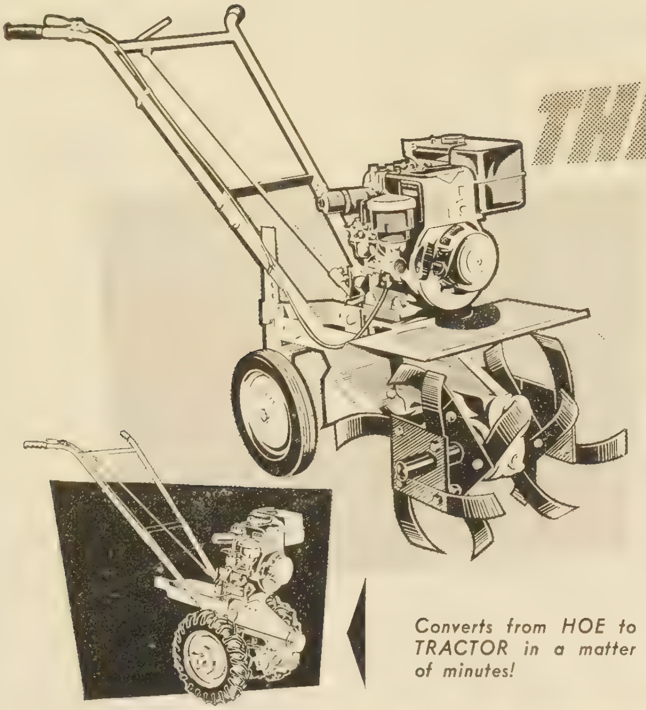
* In Nelson it is common to sow in a seedbed in March or April and transplant in August to October.

LEEKS

	AUCKLAND	HASTINGS	NELSON	CHRISTCHURCH	DUNEDIN
Sowing (seedbed)	Sept.-Oct.	Oct.-Dec.	Oct.	Sept.	Sept.
Planting (field)	When large enough	Dec.-March	Dec.-Jan.	Dec.-Jan.	Dec.-Jan.
Varieties	Musselburgh London Flag	Musselburgh London Flag	Musselburgh	Musselburgh	Musselburgh London Flag
Weed control	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical
Fertilisers	As for onions or heavier dressings			(Fowl manure, blood and bone and mineral fertilisers)	

SHALLOTS (1) and GARLIC (2)

	AUCKLAND	HASTINGS	BLENHEIM	DUNEDIN
Plant	(1) (2) Shortest day	(1) (2) Autumn-spring	(2) May-Aug.	(1) Autumn-spring
Weed control	Mechanical	Mechanical	Mechanical	Mechanical
Fertilisers	As for onions	As for onions		As for onions
Diseases	As for onions			



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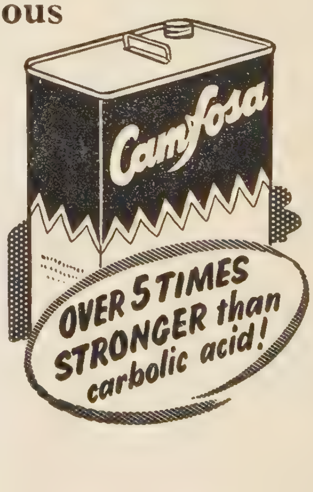
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Unlike many other crops, onions do well after onions if serious disease has not been present. Some experiments, however, indicate that onions do best after grasses, cereals, or clovers.

Onions are especially sensitive to copper deficiency, which is more likely to occur on peat soils. Several experiments have been carried out on copper-deficient areas on the Marshland peat soils, where a considerable area of onions is grown commercially. In one trial conducted by Lincoln College all treatments gave improved yields, but the plots sprayed with copper sulphate gave a better return in number and size of bulbs than either of the treatments where copper sulphate was applied to the soil.

This was ascribed to the fact that the spray treatment supplied readily available copper during the early and critical period of maximum need, and this with later spraying enabled the plants to grow on without check. It appeared also that owing to dry weather during the early growing period the soil dressings did not prove as effective in supplying the much needed copper in the early stages. With increasing root development enough copper was absorbed to sustain the plants and to overcome to a considerable extent the acute copper deficiency.

Varieties

Pukekohe Long Keeper, a globe shaped onion with a light golden brown skin, is the most widely grown onion in New Zealand. Its popularity is well merited, as it is a good quality onion which crops heavily and stores well. Though there seems to be too much variation in quality and evenness in some strains, the best strains mature early and yield heavily.

Ailsa Craig, a globe shaped onion with a rich golden or straw coloured skin, is slower maturing than Pukekohe Long Keeper. It can be grown to a larger size, but it is not such a good keeper. It usually does well from either autumn or spring sowing.

Californian Early Red is a fairly early semi-flat variety which does not go to seed readily. It may grow to a large size, but does not store well. The skin is medium deep red, the flesh firm, and the flavour mild.

Southport Yellow Globe is a good keeping onion when well matured. It is globe shaped with solid creamy white flesh and fine grain.

Southport Red Globe is a late maturing, medium sized, round to oval variety with thick purplish red skin.

Southport White Globe is a fairly good keeper, rather late in maturing, round, medium sized and solid white with a thin skin. Clean bulbs in good condition are very attractive, though it is very easy to spoil the onions with sunburn or soil stains.

White Spanish is not a long storage variety. It does well in districts where there is abundant moisture in the ground. It is succulent, mild flavoured, and almost white fleshed. Bulbs are large, round, or slightly oval with brown-yellow dry scales. White Sweet Spanish is slightly earlier and of the same shape or somewhat flatter with clear white outer scales. Brown Spanish (brown skin) and Straw Spanish (yellow skin) are generally similar to White Spanish.

Giant Rocca is an oval, very large, light reddish brown variety suited to the home garden. It keeps fairly well (considering its size and rather succulent flesh) if grown in soils of moderate fertility.

Hybrid Onions

D. E. Yen of the Department of Scientific and Industrial Research has conducted trials since 1954 comparing some of the varieties grown in New Zealand with a considerable number of U.S. hybrids selected for characteristics such as vigour, yield, and storage qualities. His report, published in 1959, showed that the yield and storage qualities of the U.S. hybrids varied with the locality and season and in general the hybrids tested were not markedly superior to Pukekohe Long Keeper. Where yields were superior, storage quality was poor and the bolting which occurred in the 1957-58 season at Lincoln makes growing of even the best of the hybrids risky for commercial producers. Pukekohe Long Keeper in the same trial gave no evidence of bolting.

For some time now hybrid onion seed of American origin has been available in New Zealand, but on the basis of the above trials cannot be recommended except for growing as "green" onions for early season non-storage production. Dr Yen advises growers buying hybrid seed to get its American name or number and check this against the list of varieties in the trials. Growers should try out hybrid or other varieties over several seasons before planting a considerable area.

Some hybrids in later trials seem more suitable for New Zealand conditions and trials with these are continuing.

Chemical Weed Control

Sulphuric acid is used for control of weeds both before onions emerge and later. CIPC is also used as a pre-emergence and post-emergence weed-killer, but on the whole has given variable results. It often causes damage when used as a pre-emergence spray, particularly when soil temperatures are high. Flat weeds, thistles, and buttercups are resistant to CIPC.

Sulphuric Acid

Pre-emergence spraying: The usual practice is to apply the fertilisers, work the soil to a fine tilth, and then leave it for about eight to 10 days before drilling the seed. Onion seed usually takes about two to three weeks to emerge, depending on ground temperatures, depth of sowing, and moisture; therefore before emergence, that is about 10 to 14 days after sowing, the rows are sprayed with sulphuric acid and white oil. For spraying, sulphuric acid of 1.5 specific gravity can be used at 12 gallons to 78 gallons of water plus 1 pint of white spraying oil; alternatively 9 gallons of sulphuric acid of 1.7 specific gravity to 81 gallons of water and 1 pint of white spraying oil can be applied.

Further spraying: A further spray may be applied when the onions are about 4 to 5 in. high and well out of the hook stage. No white oil should be included, as it would cause the spray to stick and burn the crop. The time of spraying is governed by the size of the weeds and the size of the onions. The older the weeds are the less effective is the spray. Onions cannot be sprayed after they are 10 to 12 in. high, as they tend to fall over and are burnt by the acid.

Important Points

1. Do not use post-emergence sprays of sulphuric acid.
2. Add the acid to the water, **not** the water to the acid.
3. Stir while adding acid and mix thoroughly.
4. Wear goggles and old clothes when mixing and spraying.
5. Keep some baking soda solution handy so that splashes on unprotected skin can be neutralised.

Pumps and other gear should be cleaned immediately after use with a baking soda solution at 2 lb to a gallon of water, as sulphuric acid corrodes metals and eats away sprayer washers.

CIPC

The most consistent results with CIPC have been obtained by allowing the onions to germinate weed free by the use of sulphuric acid or light aromatic oils. Once onions are past the loop stage with one or more true leaves CIPC as a directed spray is applied at rates up to 8 lb per acre. This application is supplemented by hand weeding and additional CIPC as required.

To avoid as far as practicable the risk of seed or emergence damage from the CIPC many growers sow seed 1½ in. deep, which is deeper than normal. CIPC is used by some

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growers when the plants are about 4 in. high (with three to four leaves) at 4 lb to the acre (1 gallon of the emulsion) as a post-emergence spray.

Power Kerosene

Power kerosene is used by a number of growers as a pre-emergence spray.

Diseases and Pests

Some important diseases and pests of onions and related crops in New Zealand are:

Downy Mildew

Downy mildew (*Peronospora destructor* Berk.) is a fungous disease of onions which also attacks leeks, shallots, Welsh or spring onions, and potato and tree onions. The disease is more serious in the North Island, but is also troublesome in many South Island crops, particularly those sown in autumn. It is not normally transmitted with the seed, but is carried over in diseased bulbs and in infected onion refuse. During the growing season large numbers of spores are formed on infected leaves and these are spread by wind and rain to other plants in the vicinity. Abundant moisture with cool night temperatures and relatively warm day temperatures are most favourable for the spread of the disease.

Control: Destroy refuse after harvest, rest the ground for at least two years after having an infected crop, and space crops so that a spring crop is not grown close to an autumn crop. Seedbeds are commonly infected and seedlings should be sprayed with either copper oxychloride (5 lb per 100 gallons of water plus summer oil 1 per cent) or zineb (2 lb per 100 gallons of water). A good wetting agent should be added to both the above spray mixtures. Where the disease is troublesome crops should be sprayed from the time seedlings are 2 in. high, at 14-day intervals, until growth ceases. A fine mist-like spray is most effective.

Onion Smut

The fungous disease onion smut (*Urocystis cepulae* Frost) is confined to the Marshland area of Christchurch. It appears first on onion seedlings soon after they emerge, as small, longitudinal, greyish, opaque blisters on cotyledons and leaves. These blisters eventually rupture, exposing a brown-black mass of spores. Leaves of infected seedlings when about 4 to 6 in. high appear dark blue-green and the central cylinder when broken is seen to be filled with spores.

Infected plants may be killed at any stage and most die before harvest. On older plants that survive the disease is apparent as longitudinal greyish to black spore-bearing blisters on bulbs. On growing plants spores remain slightly damp and adhere together, but a few days after onions are pulled they become liberated as a dry, black powder. The fungus does not rot bulbs in store, but infected bulbs are liable to be invaded by secondary soft-rot organisms.

The fungus can remain in the soil for about 15 years, even in the absence of a host plant. Infected onion sets and transplants are important means of spreading the disease, and wind-borne soil and surface drainage water may transport the fungus to neighbouring fields. The disease is not thought to be spread much through seed.

Seedlings are susceptible to attack about the second or third day after the seed germinates and plants are considered to be immune from infection when they are about 3 in. above the ground.

Control: Remove and burn affected plants and plant debris. Apply dilute (1.6 per cent) formalin to the soil with the seed.

Alternatively seed dusts containing thiram (not less than 50 per cent) can be applied at 50 per cent of weight of seed. To obtain the required weight of dust on seed a methyl cellulose sticker should be applied before dust treatment. This is done by making a 5 per cent solution of methyl cellulose powder in warm water by adding the powder slowly and stirring continuously. Sufficient solution is then added to wet the seed and cause it to adhere together on stirring. While keeping the seed well stirred add small quantities of the dust until the seed flows freely; repeat additions of solution and dust until the required amount of dust is taken up on the seed. Pelleted seed should be dry and have a slight excess of dust to enable it to flow freely when it is sown.

White Rot or Bottom Rot

White rot (*Sclerotium cepivorum* Berk.), sometimes known as bottom rot, may occur at any stage of growth where conditions favour it. The first signs of attack are yellowing and dying back of leaf tips; young plants wilt and die and older plants decline gradually, the leaves becoming soft and flaccid in hot weather and the bulbs remaining stunted. White fluffy fungous growth at the bases of the bulbs causes rotting of roots and basal scales. As the rot develops numerous hard, black, spherical resting bodies about 1/25 in. in diameter appear either on the surface of the rot or within it. Infection usually occurs in patches and frequently takes place in the November-January period. The disease is likely to be worse when the crop is dense and the weather wet and humid.

When infected bulbs have rotted the resting bodies are liberated into the soil, where they may remain alive for several years, even in the absence of a host plant. The disease is carried to new areas on infected bulbs, but is not seed borne, though it may be carried in fragments of onion residues with the seed.

Control: Maintain a 4- to 5-year rotation between susceptible crops and collect and destroy infected bulbs as soon as they are seen. In experiments seed pelleting with calomel (mercurous chloride) applied at 2 lb per pound of seed by the pelleting method has given appreciable control. Onion seed pelleted with calomel should be sown immediately after treatment, as germination injury occurs if treated seed is stored.

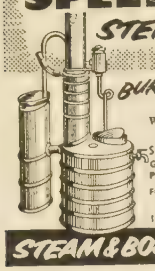
The thiram seed treatment as described for control of onion smut should be followed. In this instance the thiram should be applied first with alternate additions of methyl cellulose sticker, and finally the calomel at 2 lb per pound of seed. Dusts are added until no more is taken up on the seed; seed must be kept well stirred during treatment.

Neck Rot

Neck rot (*Botrytis allii* Munn.) of onions is also called bulb rot or botrytis rot and usually takes place after harvest through the neck tissues. The fungus causes the fleshy scales at the base of the neck to become brown, soft and slightly sunken, and clearly marked off from the parts of the bulb not yet infected. As the rot becomes established the affected area becomes greyish and later a dense grey mat develops on the surface of the bulb scales.

Spores of the fungus are readily produced in moderately warm and humid weather, and a dense grey mould consisting of large numbers of spores is formed on the outer diseased scales. Hard, black, spherical or irregular resting bodies varying in length from 1/12 in. to 1/6 in. develop in the decayed tissue. Onion bulbs sometimes become infected through the bases of scales or through wounds; in such cases symptoms are similar to those caused by infection through the neck.

Infection of bulbs usually occurs either during or just before harvest, but sometimes earlier, especially when necks are buried or partly covered with soil. Bulbs are most susceptible to infection when the neck tissues are succulent. If onions are well matured before harvest, the chances of infection are greatly reduced. The fungus is carried over in the soil and on decayed bulbs left on the field at harvest and is usually worst during cool wet weather at harvesting. Spores are disseminated by wind and germinate readily in the presence of free water.



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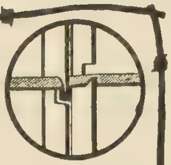

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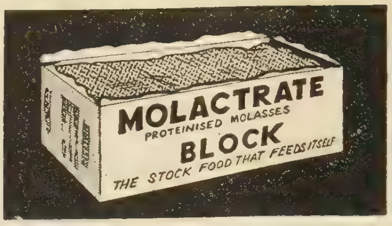

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Control: Important control measures include allowing the tops to mature and dry out thoroughly before harvest, avoiding damage to bulbs, and giving the maximum aeration during curing and storage. Storage sheds should be well ventilated and all infected bulbs destroyed as soon as they are seen.

Artificial drying by a rapidly moving hot air current (98 to 118 degrees F) sufficient to dry the necks thoroughly will check any neck rot that has not advanced beyond the incipient stage.

Damping off

Damping off occurs both before and after seedlings emerge and may be due to one of several fungi. Seed may rot; seedlings become stunted, pale watersoaked areas develop, and the roots rot.

Seedbeds should be treated immediately before sowing with copper oxychloride (50 per cent) either at a concentration of 1 per cent in water applied at 2 to 3 gallons per square yard or as a dust applied to the soil at 1 lb to 5 sq. yd. and worked in with a cultivator. For both seedling bed and direct sowing in the field seed should be dusted with thiram (70 to 80 per cent) at 2 per cent of weight of seed. Seedling beds should not be in the same area each year. On heavy soils likely to be excessively wet at certain times seedlings should be grown in raised beds.

Black Mould

Black mould (*Aspergillus niger* v. Tiegh.), a storage disease, is not usually of much importance, but it is sometimes confused with onion smut. Black mould causes black powdery spore masses which can readily be rubbed off on the exterior of bulb scales on onions in storage. Onion smut in storage produces oblong or linear black lesions, mainly near the the bases of bulbs, which penetrate to the third or fourth scale. The black mould fungus causes a gradual shrivelling of bulb scales, which become brittle.

Onion Yellow Dwarf

Onion yellow dwarf is a virus disease spread by aphids, which, though they do not normally feed on onions, alight on them when migrating and can immediately transmit the disease from infected to healthy plants. Shallots and possibly jonquils are also subject to the disease and may act as reservoirs of infection.

Leaves of infected onions and shallots lose their cylindrical shape, become flattened and crinkled, and cannot stand erect. Leaves often bend near their bases, so that much of the foliage lies on the ground. The plants have a crinkled, drooping, dwarfed appearance, but leaves may be as long as those of healthy plants. Long, narrow, yellowish streaks usually extend the length of the leaves. Flower stalks may be streaked and in extreme cases bent or twisted, but retain their cylindrical form.

Often stalks appear normal, though when they are malformed, the yield of seed is considerably reduced. Plants infected the first year may appear singly, but it is usual for them to appear in groups. Where the infection is heavy the groups may merge and infection become general.

The disease is not seed or soil borne and is only able to exist in growing plants or dormant bulbs. Control, therefore, consists in not growing seed crops in the district and the destruction of all stray small bulbs and those injured and otherwise worthless. Shallots should be lifted and sold for pickling only and no further plantings made and no jonquils should be grown in the district.

Sunscald

When onion bulbs are exposed to high temperatures during hot, sunny weather after pulling, the skin tissues may be damaged and become soft and spongy. Affected tissues become rapidly desiccated, and leathery bleached areas of a diameter of about 1½ in. develop. Affected bulbs are liable to attacks of soft rot in storage.

Onion Thrips

The onion thrips (*Thrips tabaci* Lind.), is a minute (about 1/25 in. long), slender, dark brown insect. Females are winged and very active and the immature stages are wingless, light yellow, and feed at the bases of leaves in the throats of plants, where they are well protected. Before developing into adults they live for a time in the soil. Adult thrips feed anywhere on the leaf surface and they thrive in hot, dry weather.

Control: Apply 20 per cent DDT emulsion at 2 pints per 100 gallons or 15 per cent dieldrin emulsion at 2 pints per 100 gallons at intervals of 10 to 14 days from early November until 14 days before harvest.

Onion Maggot

The onion maggot (*Hylema cana* Macq.) occasionally attacks onion seedlings by boring through the underground stem and into the bulb, causing the plant to wither and collapse. Small bulbs are mined out, but larger bulbs are rarely attacked. The maggots are small, white, and about ⅓ in. long with the head pointed and bearing a set of black chitinous jaws or raspers. The hind end is truncated, with two small, plate-like spiracles or breathing tubes.

The adult fly is about ¼ in. long and rather like a small house fly, but brownish grey. The female lays eggs near the onions, though usually only one generation a year attacks onions, the remainder breeding on decaying vegetation in the soil.

This insect is rarely troublesome, but when needed a lindane dust containing not more than 0.5 per cent of the active ingredient should be applied at 2½ lb per 500 ft of row. At least three applications at weekly intervals are needed. For autumn-sown crops the dust should be applied in early winter, but treatment is needed only if conditions are warm. For spring crops applications should begin in early spring.

Acknowledgment

Acknowledgment is made to D.S.I.R. Bulletin 24 "Diseases and Pests of Onions in New Zealand and their Control".

March Work in the Home Garden

By A. G. KENNELLY

TOWARD the end of March the days become shorter, the evenings cooler; there is no mistaking the onset of autumn. The lower temperatures and light frosts that may occur check growth of tender and half hardy vegetables, and though hardy vegetables continue to develop, growth slows as temperatures fall, and seed of even quick maturing hardy crops can be sown only in favoured localities and positions.

VEGETABLES for winter and spring use, such as cauliflowers (broccoli), brussels sprouts, fine-leaved kale, leeks, savoy and other cabbages, and silver beet, should be kept cultivated and where necessary sprayed with an insecticide such as lindane, or with DDT if infested with caterpillars and thrips only.

The plants should be encouraged to grow strongly so that they have grown to a good usable size when their

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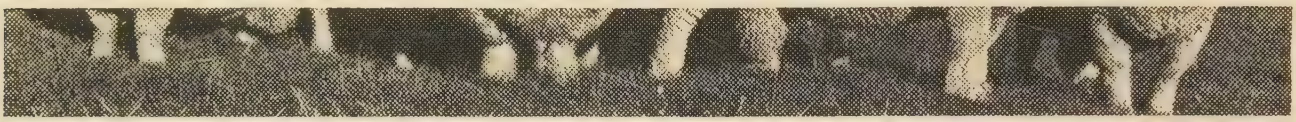

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[*Green and Hahn*

Onions should preferably be kept free from weeds right up to harvesting.

intended harvesting period is reached. Weeds should be kept down, and if the ground lacks plant food, liquid manure can be applied or a dry fertiliser dressing can be hoed in lightly.

Potatoes can be harvested when they are mature. There is rarely any advantage in leaving mature tubers undug. They are liable to be attacked by insects such as slugs, and millepedes in sufficient numbers are capable later of destroying most of the crop. Wireworms and occasionally grass grubs or the larvae of the crane fly (leatherjackets) may also damage tubers in the ground. While the tops are still green the plants may be attacked by blight if not sprayed. Mature tubers that have been sorted over to eliminate rots or other injuries liable to induce rots store well in cool conditions where there is just enough humidity to prevent drying out and shrinkage.

Celery should be sprayed with zineb or captan against leaf spot. In most northern districts and where humidity is sufficiently high, potatoes and tomatoes should be sprayed with bordeaux, copper oxychloride, or zineb against late blight and with DDT or lindane against caterpillars.

WORK IN BRIEF

Compost garden rubbish

Destroy weeds

Encourage the growth of autumn and winter vegetables by improving growing conditions and keeping down pests

Make a small sowing of onions toward the end of the month for early spring use

Make a small sowing of carrots in favoured situations in well drained soil for spring use

Dig mature potatoes

Make small sowings of salad onions, spinach, radishes, or turnips only where conditions are favourable

Sow vacant land with a green crop

Harvest mature onions and carefully cure onions intended for long keeping

Give tomatoes under glass good ventilation and where leaf mould is troublesome spray regularly with zineb or salicylanilide

Lettuce should be kept cultivated and if necessary given a side dressing of a nitrogenous fertiliser (sulphate of ammonia, nitrate of soda, or dried blood) to stimulate them to form full, crisp heads. Plants that have collapsed at the base and started to rot should be removed and burnt or buried deeply, as if left they will help to carry over the infection.

Making a Compost Heap

The compost heap should be built up with the residues of crops being harvested in autumn, hedge clippings, household refuse, and similar rubbish. Building a compost heap is not difficult and where a trench is not being maintained to dump such rubbish into in the process of digging a patch of garden, a compost heap is essential.

Methods of composting vary widely in detail, but the principles are similar. Layers of the materials to be composted should be alternated with thinner layers of farmyard manure or soil with a heavy sprinkling of artificial manure rich in nitrogen. Lime is usually added to reduce acidity and to facilitate bacterial activity. Heaps are usually long and about 3 ft 6 in. to 4 ft wide, and rarely higher than 4 ft. In heaps smaller

[*Green and Hahn*

Leeks are rarely troubled by pests or diseases.

than about 4 ft wide by about 4 ft long the ratio of exposed surface is disproportionately large compared with the volume.

The compost heap should be reasonably handy for the housewife and easily accessible with a wheelbarrow. Proximity to water, too, is a consideration for large heaps which dry out quickly.

The rate of decay depends largely on the nitrogen content of the materials, the supply of moisture and air, and such factors as the degree of acidity and the temperature. In warm weather the compost develops much more quickly and the heap may have to be turned in a couple of weeks as against several months when temperatures are low.

Late Sowings

Where winter temperatures are low it is preferable to avoid overwintering the seedlings of most kinds of vegetables in the open, as they are liable to go to seed when the warmer weather comes. Sowing in March should be confined to quick-maturing vegetables that are likely to succeed in the lower temperatures of late autumn, and the site chosen should be as favourable as possible. Quick-maturing varieties of spinach, radish, turnips, and beetroot can be sown early in the month where conditions are mild, but even with these vegetables success in most districts depends largely on weather, situation, and favourable cultural treatment.

Soil for all the above vegetables should be well drained and rich in plant nutrients and humus. Quick growth is essential for good quality. The soil should be well cultivated. Soil lacking humus can be improved by the thorough incorporation of compost or well rotted farmyard manure.

Seed can be sown ¼ in. to ½ in. deep in rows 12 to 15 in. apart. The ordinary type of radish can be sown in rows 6 to 9 in. apart or broadcast in beds.

Vegetables such as lettuce, silver beet, and cabbage or cauliflower can also be sown to mature in spring, but in the colder districts a warm, sheltered, well drained situation must be chosen.

Harvesting Onions

Onions are ready to harvest when the tops fall over just above the bulbs while the leaves are still green. Gradual dying back from the top of the leaves while the necks remain rigid, erect, and thick is an indication of abnormal ripening and usually of poor keeping quality. Correct harvesting and curing are very important if the onions are to be stored for a considerable time. The keeping quality of onions depends on a number of factors such as variety, conditions of growth, harvesting, and storage.

Drying or curing usually takes three to four weeks. In the lower rainfall districts where a spell of fine autumn weather is likely bulbs can be left on the ground. The tops should be left on to give them some protection from the sun. If rain falls or there are heavy dews, bulbs should be turned to enable them to dry evenly and to check rot, sprouting, or discolouration by the wet soil. If the weather is wet, onions may have to be dried in a shed before being stored.

Kumaras

Most varieties of kumaras are likely to be injured when the temperature falls to 40 degrees F (8 degrees above freezing point) and the keeping quality is so seriously affected that long storage is usually impossible. Ground temperatures are usually still high in March, but they fall steadily thereafter and night air temperatures are often quite low. Great care is necessary in digging to avoid injuries, which lead to storage rots.

Spring Cabbages and Cauliflowers

In most districts April is the preferred month for setting out the first of the spring cabbage and cauliflower plants, but in some of the colder areas growers prefer to make a start toward the end of March. Only the best plants should be set out in well prepared soil.

Seedlings should be sprayed with DDT if thrips and caterpillars appear on them or with lindane if grey aphids become troublesome.

Mildew is more difficult to control on seedlings because it is difficult to wet the undersides of the leaves with the spray, but copper oxychloride is effective if a sprayer giving a fine mist is used. A little household detergent added to the spray mixture usually helps.

Cauliflowers can be treated similarly to cabbages, but being a more sensitive crop in the colder areas, needs more favourable conditions than cabbages.

Green Cropping

Lack of organic matter is responsible for the decline in fertility in many home garden soils. It can be overcome by regular green cropping or by adding organic material such as compost, rotted straw, well rotted sawdust (in moderation), stable, farmyard or poultry manure, rotted leaves, or hedge clippings.

All these materials rot down to form humus, which combines with the soil particles to give the soil a desirable crumby structure which will retain moisture, yet facilitate drainage, will not pan or become porridge-like after heavy rain, and will provide a congenial environment for small germinating seeds or seedlings. Lack of success in seed sowing and the raising of plants through the seedling stage is attributable in a great many gardens to poor soil conditions due to lack of organic matter.

Lambing Estimates for 1960 Season

The estimated number of lambs for the 1960 season and the estimated number of breeding ewes were the highest recorded. The Dominion total of lambs was 32,070,208, an increase of 697,066 over the number for 1959, and that of breeding ewes was 32,632,784, an increase of 816,691.

The lambing percentage of 98.28 was lower than the 98.61 of 1959, the results being adversely affected by lack of flushing feed because of dry summer and autumn conditions in parts of both the North and South Islands.

Southland again had the best land district lambing percentage with 114.01. The South Island percentage was 104.55 and the North Island percentage was 92.99.

Totals for counties, districts, and the Dominion are set out in the following tables, contributed by the Animal Industry Division of the Department of Agriculture.

NORTH AUCKLAND LAND DISTRICT

County	Breeding ewes (as at 1960)	Estimated percentage of lambs	Estimated number of lambs
Mangonui	57,488	75.89	43,628
Whangaroa	30,513	85.50	26,089
Hokianga	56,010	81.67	45,743
Bay of Islands ..	153,548	84.90	130,362
Whangarei	186,323	88.80	165,455
Hobson	184,139	86.73	159,704
Otamatea	181,716	92.39	167,887
Rodney	214,740	88.12	189,229
Waitemata	160,124	93.50	149,716
Great Barrier Island	6,420	67.10	4,308
Manukau	114,709	90.60	103,926
Franklin	227,316	93.48	212,495
Totals	1,573,046	88.91	1,398,542

SOUTH AUCKLAND LAND DISTRICT

Raglan	692,190	93.52	647,336
Waikato	316,158	95.93	303,290
Waipa	270,885	98.23	266,090
Otorohanga	362,442	92.31	334,570
Waitomo	632,432	89.66	567,039
Taumarunui ..	524,836	94.30	494,920
Coromandel ..	54,207	77.20	41,848
Thames	25,712	93.40	24,015
Hauraki Plains ..	37,510	91.70	34,397
Ohinemuri	53,002	91.20	48,338
Piako	182,685	97.21	177,588
Matamata	466,499	99.35	463,467
Tauranga	268,228	96.40	258,572
Rotorua	359,862	92.90	334,312
Taupo	186,308	92.13	171,646
Whakatane	120,810	87.10	105,226
Totals	4,553,766	93.83	4,272,654

TARANAKI LAND DISTRICT

Clifton	130,576	87.32	114,019
Taranaki	53,944	91.84	49,542
Inglewood	94,428	95.65	90,320
Egmont	51,729	91.82	47,497
Stratford	263,740	92.10	242,905
Eltham	78,891	95.84	75,609
Waimate West ..	10,477	90.31	9,462
Hawera	100,995	93.72	94,653
Totals	784,780	92.26	724,007

GISBORNE LAND DISTRICT

County	Breeding ewes (as at 1960)	Estimated percentage of lambs	Estimated number of lambs
Opotiki	72,565	81.05	58,814
Matakaoa	74,152	83.84	62,169
Waiapu	267,565	86.55	231,576
Uawa	122,381	83.36	102,017
Waikohu	379,999	90.72	344,735
Cook	488,158	76.62	374,027
Totals	1,404,820	83.52	1,173,338

HAWKE'S BAY LAND DISTRICT

Wairoa	462,608	86.27	399,092
Hawke's Bay ..	1,299,316	99.79	1,296,587
Waipawa	562,147	100.29	563,777
Waipukurau ..	189,097	92.68	175,255
Patangata	687,704	92.78	638,052
Dannevirke	508,243	100.13	508,904
Woodville	133,181	93.62	124,684
Totals	3,842,296	96.46	3,706,351

WELLINGTON LAND DISTRICT

Patea	277,924	95.40	265,139
Waimarino	241,600	93.84	226,717
Waitotara	185,537	92.56	171,733
Wanganui	344,480	91.85	316,405
Rangitikei	1,146,678	93.99	1,077,763
Kiwitea	343,152	93.10	319,475
Pohangina	173,381	96.07	166,567
Oroua	315,880	100.58	317,712
Manawatu	202,597	107.30	217,387
Kairanga	134,802	102.12	137,660
Horowhenua ..	160,601	94.50	151,768
Hutt	77,139	89.84	69,302
Makara	59,641	78.81	47,003
Pahiatua	210,841	93.20	196,504
Akitio	181,392	76.11	138,057
Eketahuna	194,448	94.77	184,278
Mauriceville ..	63,271	93.16	58,943
Masterton	503,357	88.78	446,880
Wairarapa South ..	258,544	95.51	246,935
Featherston ..	417,304	93.83	391,556
Chatham Islands (provisional) ..	52,463	75.00	39,347
Totals	5,545,032	93.55	5,187,131

MARLBOROUGH LAND DISTRICT

Sounds	82,397	73.80	60,809
Marlborough ..	342,408	93.60	320,494
Awatere	198,655	93.40	185,544
Kaikoura	153,561	96.40	148,033
Totals	777,021	92.01	714,880

NELSON LAND DISTRICT

County	Breeding ewes (as at 1960)	Estimated percentage of lambs	Estimated number of lambs
Waimea	228,105	96.40	219,813
Golden Bay	51,591	92.40	47,670
Buller	4,338	83.90	3,640
Murchison	49,110	90.60	44,494
Inangahua	34,394	90.30	31,058
Totals	367,538	94.32	346,675

WESTLAND LAND DISTRICT

Grey	56,312	111.00	62,506
Westland	57,154	102.70	58,697
Totals	113,466	106.82	121,203

CANTERBURY LAND DISTRICT

Amuri	301,278	94.30	284,105
Cheviot	190,696	96.80	184,594
Waipara	390,578	100.30	391,750
Kowai	121,501	105.50	128,184
Ashley	93,270	99.00	92,337
Rangiora	82,865	109.00	90,323
Eyre	99,177	104.80	103,937
Oxford	128,201	101.10	129,611
Tawera	61,177	92.30	56,466
Malvern	246,559	101.40	250,011
Paparua	82,046	102.50	84,097
Waimairi	2,665	99.70	2,657
Heathcote	8,353	98.30	8,211
Halswell	24,975	101.10	25,250
Mt. Herbert ..	40,442	100.10	40,482
Akaroa	95,633	103.20	98,693
Wairewa	71,439	99.00	70,725
Springs	56,673	108.30	61,377
Ellesmere	133,224	109.90	146,413
Selwyn	226,813	97.50	221,143
Ashburton	1,432,500	100.40	1,438,230
Geraldine	403,904	98.80	399,057
Levels	320,331	104.90	336,027
Mackenzie	394,984	87.00	343,636
Waimate	735,213	105.30	774,179
Totals	5,744,497	100.30	5,761,495

OTAGO LAND DISTRICT

Waitaki	630,706	106.50	671,702
Waihemo	150,698	106.00	159,740
Waikouaiti	107,548	101.00	108,623
Peninsula	27,852	99.00	27,573
Taieri	252,799	93.00	235,103
Bruce	401,565	112.00	449,753
Clutha	830,719	109.50	909,637
Tuapeka	535,322	100.50	537,999
Maniototo	326,332	110.00	358,965
Vincent	341,645	97.00	331,396
Lake	172,918	83.10	143,695
Totals	3,778,104	104.13	3,934,186

SOUTHLAND LAND DISTRICT

County	Breeding ewes (as at 1960)	Estimated percentage of lambs	Estimated number of lambs
Southland	3,143,170	115.50	3,630,361
Wallace	1,002,921	109.50	1,098,198
Stewart Island ..	2,327	51.00	1,187
Totals	4,148,418	114.01	4,729,746

DISTRICT ESTIMATES

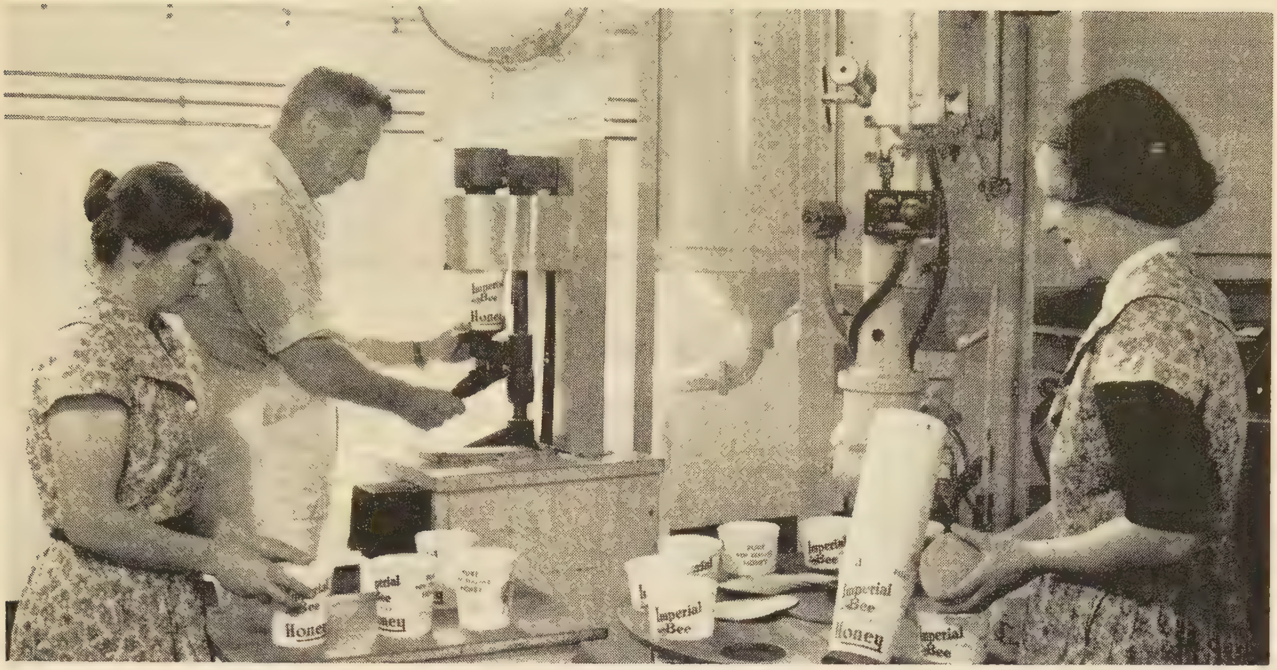
North Auckland ..	1,573,046	88.91	1,398,542
South Auckland ..	4,553,766	93.83	4,272,654
Gisborne	1,404,820	83.52	1,173,338
Hawke's Bay ..	3,842,296	96.46	3,706,351
Taranaki	784,780	92.26	724,007
Wellington	5,545,032	93.55	5,187,131
Marlborough ..	777,021	92.01	714,880
Nelson	367,538	94.32	346,675
Westland	113,466	106.82	121,203
Canterbury	5,744,497	100.30	5,761,495
Otago	3,778,104	104.13	3,934,186
Southland	4,148,418	114.01	4,729,746
Totals	32,632,784	98.28	32,070,208

Dominion Totals

The following table shows the estimated lambing for the North and South Islands for 1960 and the previous five years and the number of lambs tailed.

Year	Number of breeding ewes	Estimated percentage of lambs	Estimated number of lambs	Actual number of lambs tailed
NORTH ISLAND				
1960 ..	17,703,740	92.99	16,462,023	—
1959 ..	17,168,067	94.20	16,172,608	—
1958 ..	16,421,132	95.43	15,670,262	15,488,683
1957 ..	15,484,109	90.89	14,073,099	13,788,129
1956 ..	14,607,606	89.15	13,023,395	12,899,166
1955 ..	14,103,936	87.38	12,323,682	12,325,564
SOUTH ISLAND				
1960 ..	14,929,044	104.55	15,608,185	—
1959 ..	14,648,026	103.77	15,200,534	—
1958 ..	14,454,572	106.32	15,367,436	15,086,149
1957 ..	13,415,361	104.08	13,962,728	14,010,852
1956 ..	12,408,006	100.44	12,462,148	12,597,109
1955 ..	12,082,422	103.46	12,500,215	12,595,900
DOMINION				
1960 ..	32,632,784	98.28	32,070,208	—
1959 ..	31,816,093	98.61	31,373,142	—
1958 ..	30,875,704	100.52	31,037,698	30,574,832
1957 ..	28,899,470	97.01	28,035,827	27,798,981
1956 ..	27,015,612	94.34	25,485,543	25,496,275
1955 ..	26,186,358	94.80	24,823,897	24,921,464

Preparing Granulated Honey for Sale and Export



[*Sparrow*

Packing honey at the Honey Marketing Authority's plant in Auckland.

By R. S. WALSH,

Honey Grader, Department of Agriculture, Auckland

SOME people still prefer a firmly granulated honey and most packers find it necessary to have stocks of it available. Honey of this type is also ideally suitable for bulk supply to the Honey Marketing Authority. This article discusses some of the more essential points in its preparation.

PROCESSING methods should be such that honey retains all its natural characteristics and does not deteriorate between seasons.

Unfortunately, a tendency to early souring is all too common in honey sold on the Auckland market which is stored at room temperatures. This is not always due to excess moisture in the honey, but is sometimes the result of freshly gathered nectar being stored in combs that have been kept wet from the previous season, or in combs that have held feed honey stored under unsuitable conditions over winter. The use of starter honey heavily impregnated with yeast cells is another source of contamination, as are unclean honey house utensils and floors.

Honey should be extracted as soon as it is fully capped. Nothing can be gained by waiting until the finish of the honey flow or later. In most northern districts, atmospheric moisture increases as the cooler weather approaches, and honey on the hives or in the honey house is increasingly exposed to the risk of moisture contamination the longer extraction is delayed.

In addition, lines of even quality can be more easily packed with early extraction. If more than one source of honey has been gathered, the honeys can be extracted separately and the darker or stronger flavoured honey can be kept for feeding back to the bees or sold for manufacturing. All honey is not suitable for blending and it is best separated at the outset.

It is important that lines of honey sent to the Honey Marketing Authority should be even, as when the honey is graded, the darkest sample in a line is the one coloured by the grader for grade points. This could reduce substantially the payout to the supplier and he may, in addition, be charged with re-sorting costs.

Moisture Content Important

Honey with a moisture content above 17.2 per cent, seeded with 3 to 5 per cent of grainless starter, will granulate firmly with a fine texture if held at a temperature between 45 and 55 degrees for 10 days and will remain in excellent condition for a considerable period thereafter at room temperatures. Honey of good flavour so prepared will give every satisfaction to consumers who prefer a firmer pack.

This class of honey will also receive the maximum price according to grade from the Honey Marketing Authority. Though no premium is paid for finely granulated honey by the Authority, a penalty applies to liquid honey. As it is necessary to supply the Authority with granulated honey where possible, it is in producers' interests to prepare it to the best of their ability, even though they may not be equipped with the cooling plant necessary to produce

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GRANULATED HONEY . . .

the finest granulation in large quantities of bulk honey. Honey shipped by the Authority as straight lines to export markets, if attractively packed by the supplier, should increase overseas sales and enhance the reputation of New Zealand honey.

The Honey Export Regulations, 1950, prescribe a maximum moisture content of 17.2 per cent for all honey exported. If the moisture content of honey supplied to the Authority exceeds this maximum, it cannot be exported until the excess moisture has been removed. This involves the Authority in extra costs for which the supplier has to pay in the form of penalties imposed on honey of low specific gravity.

Avoidable Defects

Some honeys contain more air than they should and air bubbles harbour yeasts that tend to deteriorate the keeping qualities of honey. Pumps run at incorrect speeds, excessive stirring, wrong straining methods, and overheating all contribute to this defect.

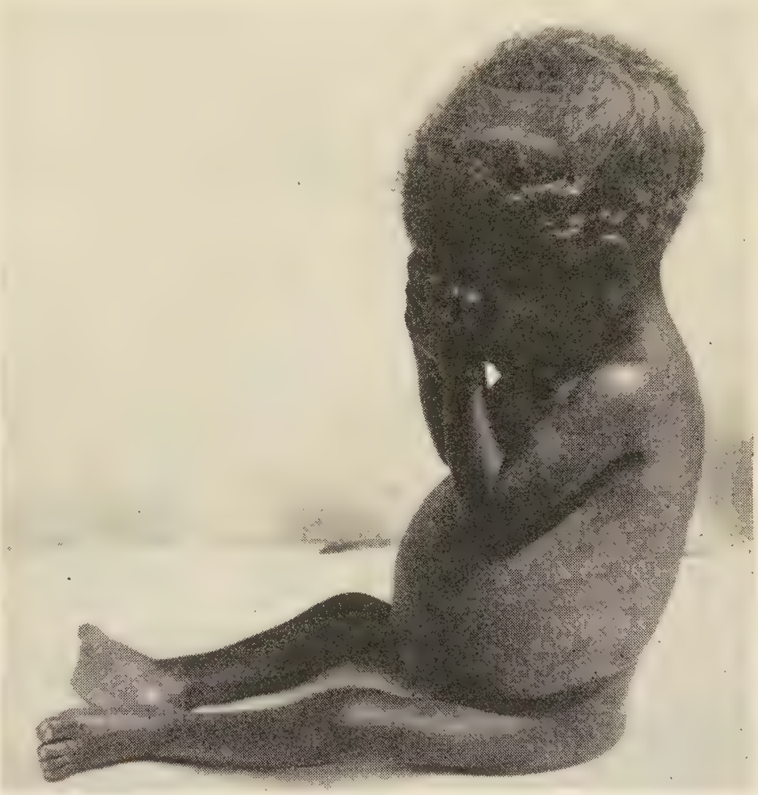
Care in heating is very necessary to retain the delicate flavour of the honey. The secret of applying heat to honey is quick heating and cooling. Though reasonably fine-grained honey can be improved by stirring, coarse-grained honey must be heated to melt out the crystals, and the degree of heat applied is governed by the coarseness of the crystals. A temperature of 140 degrees for 20 minutes will destroy all yeasts and most crystals, but very coarse crystals may require a temperature of 170 degrees for 10 minutes. A burnt flavour does not assist the sale of honey and can cause rejection by the grader. The same applies to all taints whether the result of heat, phenol used in the removal of honey from the hives, oil from tins or machinery, smoke, or fumigants for bee combs.

It is often necessary for the Authority to store honey for a full year at its Auckland depot, and as it cannot all be placed in cool storage, every precaution must be taken by the supplier to ensure that the keeping quality of the honey is unimpaired; otherwise, costly reprocessing is sometimes necessary before the honey can be shipped overseas. Most of the honey supplied to shops by producers and packers is in cartons which are not a good protection against humidity; so unless the honey has been sterilised, the creamed type cannot be expected to remain in good condition for more than a few months. The carefully prepared, firmly granulated type of pack remains in good condition much longer than other types and assisted by the climate soon develops a natural spreadability.

◆

Freedom from Hunger Campaign

> . . . *In the final analysis the whole of the campaign must stimulate action by member governments towards increased food production, more efficient distribution and better nutrition.*—Report on campaign by 29th Session of FAO Council.

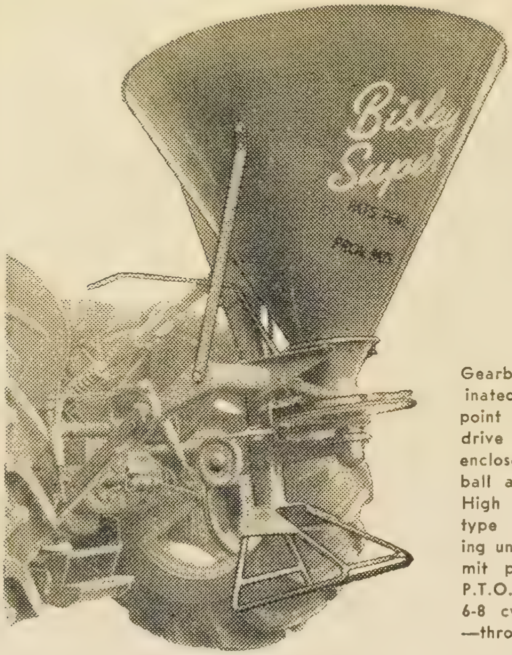


The little African child is suffering from protein malnutrition, and has uncurled greying hair, oedema, and skin lesions. The condition is common in areas where diets are high in starchy foods and low in protein and can be cured by protein-rich foods such as skim milk.

To combat widespread protein malnutrition among young children inexpensive protein-rich foods are being developed under a United Nations programme.

The task of popularising such foods through education in nutrition is an important one.

Studies are now being made of the possibilities of starting large scale campaigns in a few selected countries to promote the consumption of products that have been approved by the World Health Organization Protein Advisory Group.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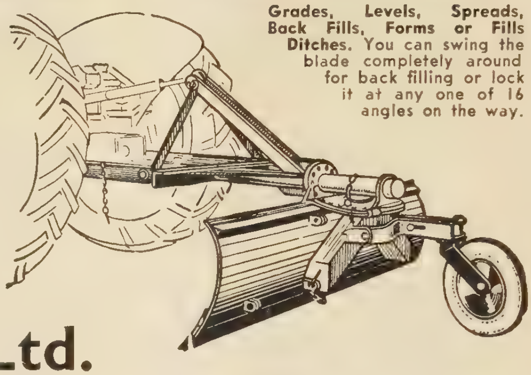

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The Home Orchard in Autumn

By S. FREW,

Instructor in Horticulture,
Department of Agriculture,
Christchurch

[*Sparrow*

THOUGH most owners of home orchards are more interested at this time of the year in the picking and storing of their crops than in maintenance work, some orchard hygiene and other work still requires to be done in autumn. These activities, and the treatment of seedling fruit trees appearing in the home garden, the development of the multi-variety fruit tree, and work among the berry fruits, are discussed in this article.

THE incidence of disease next season can be reduced by taking some elementary precautions now. Fallen fruits, frequently rotten and perhaps diseased, should be removed and destroyed. Weed growth which could harbour overwintering insect pests should be cleared from round trees and the trees themselves cleared of any diseased branches or twigs; loose bark, particularly any round the butts, should be peeled off to discourage pests from hibernating there.

A clean-up spray after the fruit is harvested and before the leaves fall is an added insurance for a cleaner crop next year, as it will help to control fungous disease. Bordeaux mixture at a strength of 6½ oz of bluestone and 5¼ oz of hydrated lime to 4 gallons of water should be used.

Seedling Stone Fruit Trees

Seedling trees frequently appear in the home garden. Peaches and plums in particular are common adventitious introductions, generally the result of refuse buried after the fruit preserving season or from stones of dessert fruit cast out by members of the family. There is no guarantee that these seedlings of unknown parentage will produce quality fruit, or any at all, but their survival proves their inherent vigour as root stocks.

The enthusiastic home orchardist can propagate some worth-while trees from these stocks by the budding on of recognised suitable varieties.

While peach varieties are naturally the most suitable to propagate on peach seedlings, and plum varieties on plum seedlings, this rule need not be rigidly adhered to. Nectarines, being only a sport from the peach, will of course thrive when budded on to peach seedlings, while Japanese plums and even apricots can often be successfully propagated on peach stocks, though this union is not always a strong one and the resultant trees are sometimes short lived. Both European and Japanese plums can be budded on to seedling plum stocks.

The following table indicates the scion and stock affinity which can be expected with peach and plum seedlings:

Seedling	Scion	Remarks
Peach	Peach	Natural union
	Nectarine	Natural union
	Japanese plum	Vigorous, and shy-cropping varieties most suitable Trees are sometimes short lived
	Apricot	Trees may be short lived, but generally a satisfactory union takes place
Plum	European plum	Natural union
	Japanese plum	Most varieties make a good union

Multi-variety Tree

Budding of stone fruit trees need not be confined to seedling trees. Trees of any age may be budded provided one-year-old wood of a suitable size is available. Trees having an established framework may be budded where a multi-variety tree is desired.

The novelty of having a tree bearing more than one variety has considerable merit in the home garden. A full-sized stone fruit tree in full bearing may produce more fruit of the one variety, maturing over a short period, than the family can consume, but if the tree is carrying two, three, or even four varieties which mature at different periods, its total crop can often be used completely. Again, the novelty of growing two kinds of fruit on the one tree can be achieved by budding peach and nectarine on separate branches.

While apricots and Japanese plums can also be tried in conjunction with peach, this is not recommended, as the dwarfing tendency of these fruits when budded on to peach may become more pronounced and a lop sided tree with an unthrifty portion might result. As

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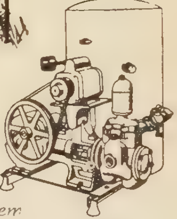

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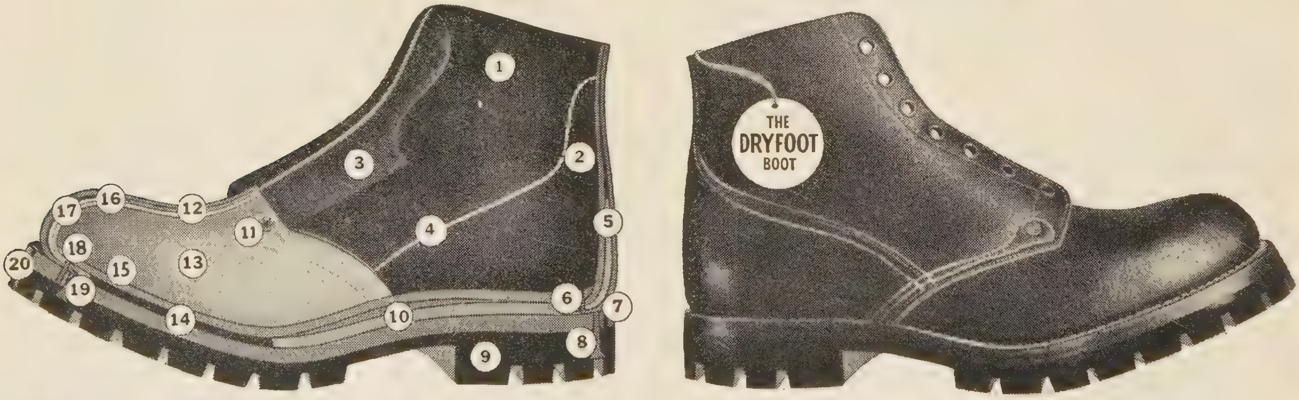

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a novelty, however, any combination of peach, nectarine, plum, and apricot could be tried.

Improved Plum Pollination

A multi-variety plum tree has the further advantage of improved pollination. Plums are notoriously self-unfruitful, many requiring cross pollination, and the close proximity of pollinating varieties on the same tree provides ideal pollination.

It is essential, of course, that the two or more varieties being used are compatible; that is, the pollen of one must be capable of fertilising the other and when varieties for the multi-variety tree are selected this must be taken into consideration.

With European plums this is not a problem, as practically every plum is capable of pollinating any other European plum, but it should be noted that the pollen of Japanese varieties does not seem to be capable of fertilising European varieties.

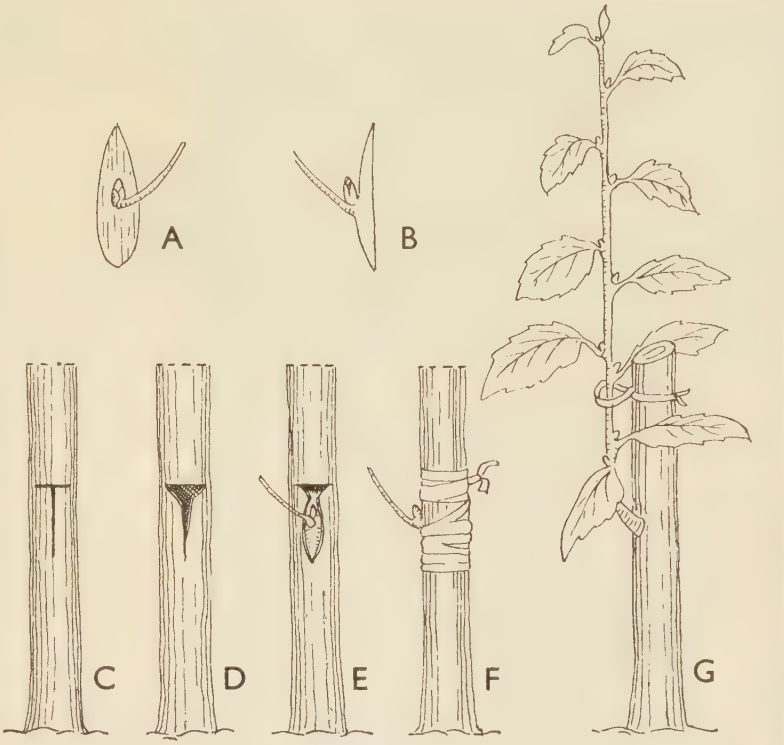
Though many varieties of Japanese plums are self-fruitful, or partially self-fruitful, others are completely self-unfruitful. Considerable work has been done by officers of the Horticulture Division in investigating suitable pollinators for these varieties and this work has not yet been completed. As a general rule, however, the varieties Omega, Santa Rosa, and Sultan, themselves self-fruitful, act as good pollinators for most other Japanese varieties.

Budding

The same type of budding is practised with both seedling and mature trees. The method is simple and can be used successfully by most amateurs. Buds should be inserted in the stocks of seedling trees at a height of 3 in. or 4 in. to ensure that the union of stock and scion is well above ground level.

When mature trees are being budded suitably placed one-year-old wood in the existing tree should be used for the insertion of buds. The buds should preferably be placed on the outside of the tree so that subsequent growth will not crowd the centre of the tree.

Budding of peaches and plums may be done in February or March, when the bark of the stock will usually lift readily without tearing. A successful take is indicated if the bud is still fresh at the end of three weeks. If the season is not too far advanced, a failure can be replaced by inserting a fresh bud in another part of the stock on one-year-old wood. Buds will remain dormant until the following spring, when, at the first signs of growth, the stocks on existing framework beyond the bud should be removed to allow the young growth of the new variety to develop and become established.



Steps in budding. A and B: Bud prepared for insertion. C: Incision in stock. D: Bark lifted. E: Bud in position. F: Bud tied. G: Growth the following season as the result of a successful take.

Storage of Pip Fruit

Many varieties of pip fruit will keep quite a long time if they are packed at the correct stage of maturity and are stored under good conditions. For long storage, fruits should be picked when they are approaching maturity but before they are fully mature. Within these defined limits of maturity the earlier the fruit is harvested the longer it will keep. Fruit picked immature will never ripen; it will merely shrivel and remain tough and unpalatable.

Not all varieties of apples and pears are suitable for storage. Early-maturing varieties generally have a short life and should not be stored. Mid-season varieties will keep reasonably well if picked at the correct stage and stored under suitable conditions, while late-maturing varieties usually keep well under good storage conditions.

Only the best fruit should be selected for storage. The prerequisites for successful storage are that the fruit must be picked at the correct stage of maturity and that it must be sound and free from disease and insect damage. Fruit with cuts, bruises, stem punctures, and other defects injuring the skin should not be stored, and diseased fruit should of course be eliminated, as many diseases will continue to develop during storage, either shortening the fruit's storage life or rendering it still more unattractive by the time it is ready for use.

The three main factors in successful storage are:

1. **Temperature**. A cool temperature is imperative. Fruit stored in a warm temperature will ripen rapidly; a low temperature will retard ripening. The best temperature for fruit storage varies with the different kinds and varieties. Pears hold best at a temperature of 32 to 34 deg. F and apples 34 to 38 deg. Freezing temperatures must be avoided, as rapid breakdown of the flesh will result if it is frozen.
2. **Light**. Particularly bright sunshine hastens ripening. Darkness is therefore essential and is perhaps equally as important as a cool temperature.
3. **Humidity**. Fruit held under very dry conditions will shrivel. A reasonably moist atmosphere will reduce this tendency to wilt. Excessive moisture will merely induce rots, so a moderately moist atmosphere as distinct from wet conditions should be aimed at.

Most home gardeners should be able to provide reasonable storage condi-

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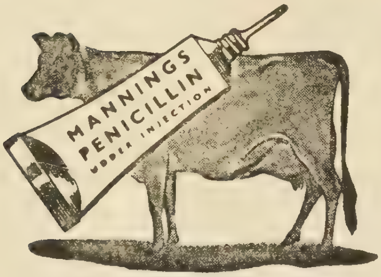

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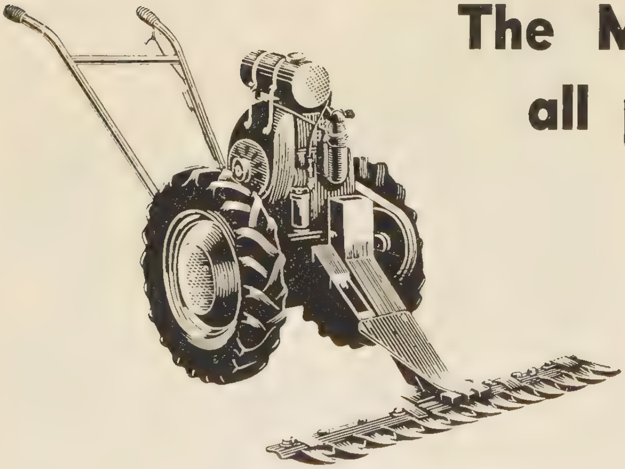

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tions which will meet these requirements. Fruit may be stored in boxes under trees, hedges, or other shade and be provided with a cover to exclude rain. Thus protected from frost, sunshine, and rain, but receiving the natural moist atmosphere of normal winter and spring weather, apples and pears may be kept satisfactorily for comparatively long periods.

A cellar is a popular storage place; it usually provides two desirable conditions—cool temperature and darkness—but frequently it lacks the third requirement, humidity. For fruit to be successfully held in these surroundings, an artificially moistened atmosphere may need to be provided. Fruit so held should be stored in boxes covered with a damp sack kept moistened by regular sprinkling.

A damp cellar provides ideal conditions. Fruit held in these premises will generally keep very well. If practicable, fruit should be spread out on racks or trays for easy observation and to facilitate the removal of fruit as it ripens. By this means all fruit is held for its maximum life and the best results are obtained from storage.

THE BERRY FRUIT GARDEN

Quite a lot of useful work with berry fruits that is usually delayed until winter can be done at this time of the year while conditions outdoors remain more congenial. The early completion of such work also has some cultural advantages, particularly with raspberries and black currants. Routine work is also necessary with other berry fruits.

Raspberries

As soon as fruiting is finished the old canes which carried the season's crop may be removed. If spent canes are removed in autumn instead of being left until winter, the bushes will be opened up at a time when this will still assist in the development and ripening of the new season's cane wood. The old canes should be removed by being cut with secateurs as close as possible to ground level; otherwise eventually over the years an unsightly clump of dead stumps will accumulate and provide harbourage for diseases and pests.

Weak new canes can be removed and the sturdier ones spaced so that there is room for fruiting laterals to develop. From 12 to 16 canes per bush should be aimed at. The tipping of the new canes should not be done until winter. The removal of the tips of canes ensures a more even bud break of fruiting laterals and the thin tips of canes if left intact cannot be expected to carry good strong laterals. After pruning, the canes may be loosely tied to facilitate spraying and cultivation round bushes.

Black Currants

Black currants can also be pruned at this time of the year. With harvesting completed, there is no reason why the old shoots which bore last season's crop should not be removed. Indeed it is advantageous, in that all the vigour for the remainder of the growing season is then directed into the new wood which has been retained. As black currants bear practically their whole crop on the new wood, the stronger this can be induced to grow, the more potential bearing wood there is developed.

The aim in pruning black currants should be to eliminate as much old wood as possible while retaining sufficient of the strongest new shoots to make a well furnished but well spaced bush. Old wood should be cut out at a fairly low level at a point where the strongest new shoots have emerged. The pruned bush, still in leaf, will then comprise healthy new growth, well spaced and capable of still further development during the remainder of the present growing season.

Loganberries planted in hedge system and wired after pruning and mulching. Old canes that fruited in the previous season have all been removed.

Loganberries and Boysenberries

The new growth from these plants which will now be rambling over the adjacent ground should be left untouched at this time of the year, but if new plants are required, they may be propagated by pegging and burying the tips of the new canes. Later, in the winter, when roots have developed, the new plants can be detached and planted out in their permanent positions.

Strawberries

Autumn planting is favoured in many localities and is recommended in areas where the land does not lie wet in winter, when root rots might develop.

Land should be well prepared before being planted out with the young plants. Cultivation should be done to a depth of 8 to 10 in., and a good dressing of a complete manure should be applied during this cultivation. A good mixture for this purpose is 4 parts of blood and bone plus 1 part of sulphate of potash applied at 4 oz per square yard.

For the home garden a 3 ft-wide bed is suitable; plants may be set out at 15 in. intervals in a double row and subsequent runners trained inward to form a compact bed.

Roots may be trimmed before plants are set out. Soil should be worked in among the roots and the plants well firmed after planting. A watering immediately after planting will further settle them and help early establishment.

Meteorological Records for December

Station	Height of station above M.S.L. (ft)	Air temperatures in degrees (Fahrenheit)				Rainfall in inches					Bright sunshine hours
		Approx. mean	Difference from normal	Absolute maximum and minimum		Total fall	No. of days of rain	Difference from normal	Maximum fall		
				Maximum	Minimum				Amount	Date	
Kerikeri	240	61.6	—1.1	78.0	42.5	4.82	17	+0.97	1.36	6	188
Auckland	160	62.2	—1.5	77.1	47.9	3.78	13	+0.85	0.81	9	237
Tauranga	12	61.0	—1.1	80.2	39.2	2.30	8	—1.23	0.57	5	231
Ruakura	131	59.2	—1.5	76.5	36.6	2.91	15	—0.17	0.96	8	211
Whakarewarewa ..	1,006	58.4	—1.8	77.9	35.1	1.25	9	—2.91	0.47	20	191
Gisborne	14	60.3	—2.4	80.5	43.4	5.55	14	+3.64	1.35	10	209
New Plymouth ..	160	59.4	—0.6	72.6	37.6	0.77	9	—3.82	0.16	20	200
Karioi	2,125	54.0	—1.2	76.0	31.8	3.39	13	—0.52	0.80	9	
Napier	5	61.1	—2.1	85.2	45.8	4.87	14	+2.89	0.84	10	186
Wanganui	72	59.3	—2.1	73.5	44.6	1.78	11	—1.08	0.40	2	223
Palmerston North ..	110	59.2	—1.2	78.4	39.1	2.10	12	—1.18	0.67	9	180
Waingawa	340	57.0	—3.2	82.2	34.2	4.90	16	+2.39	1.13	9	195
Wellington	415	57.2	—1.9	74.7	41.9	2.34	14	—1.12	0.99	6	235
Nelson airfield ..	5	60.0	+0.6	84.1	37.2	1.76	5	—1.08	1.04	29	250
Blenheim	14	60.0	—0.8	86.8	36.9	0.82	8	—1.18	0.24	11	217
Hokitika South ..	15	56.4	+0.3	72.3	36.6	1.96	7	—8.00	1.31	16	284
Hanmer Forest ..	1,270	54.4	—3.4	81.9	32.5	6.27	16	+2.56	1.05	7	158
Christchurch	22	57.4	—2.4	88.0	41.5	3.70	12	+1.16	1.44	1	178
Ashburton	323	57.9	—1.2	92.0	39.8	2.59	12	—0.42	1.00	1	188
Timaru	56	58.7	+0.0	89.1	40.2	3.49	11	+0.83	1.10	8	216
Alexandra	520	59.0	—1.2	83.5	38.0	0.32	3	—0.98	0.18	16	243
Taieri	80	55.0	—1.0	79.4	37.9	2.41	15	—0.15	0.63	3	148
Invercargill airfield ..	0	53.8	—1.2	72.0	33.0	2.00	15	—1.60	0.97	16	196
Chatham Island ..	150	56.3	+1.3	66.9	41.6	3.83	12	+1.54	1.65	2	

Dairy Produce Graded for Export

THE following figures showing quantities of dairy produce graded for export during November 1960 and for the 4 months ended 30 November 1960 with comparative figures for the same month and the 4 months of 1959 have been compiled by the Dairy Division of the Department of Agriculture from figures supplied by divisional officers at the various grading ports:

BUTTER

Period	Creamery (tons)	Whey (tons)	Total (tons)	Percentage increase
November 1960	25,686	464	26,150	—
November 1959	23,540	406	23,946	—
Increase	+2,146	+58	+2,204	+9.204
4 months ended 30/11/60	79,691	1,366	81,057	—
4 months ended 30/11/59	76,683	1,274	77,957	—
Increase	+3,008	+92	+3,100	+3.977

Butter in store at 30 November 1960 was 24,942 tons

CHEESE

Period	White (tons)	Coloured (tons)	Total (tons)	Percentage increase
November 1960	12,523	1,571	14,094	—
November 1959	12,443	611	13,054	—
Increase	+80	+960	+1,040	+7.967
4 months ended 30/11/60	31,513	5,718	37,231	—
4 months ended 30/11/59	30,665	4,918	35,583	—
Increase	+848	+800	+1,648	+4.631

Cheese in store at 30 November 1960 was 16,901 tons

If these figures are converted into butterfat equivalent, there is an increase of 4.088 per cent in butterfat graded for the 4 months as compared with the preceding season. The above figures refer only to butter and cheese graded for export and do not include butter and cheese used on the local market and other products such as anhydrous milk fat, whole milk powder, and other whole milk products, and are not necessarily a true indication of production trends.

Book Review

"Grass to Milk": C. P. McMeekan

IN summarising in the 200 pages of his very readable new book his philosophy of dairy farming in New Zealand, Dr C. P. McMeekan, Director of the Department of Agriculture's Ruakura Animal Research Station, has done a job that should ensure maximum benefit accruing from the application in practical farm management of the results of the welter of research and experimental work in dairy husbandry that has been done at Ruakura and elsewhere in this country.

This is no stuffy scientific work laced starchily with tables, graphs, and references. It is a clear, concise distillation of the thoughts and opinions of one who has himself done a lot of the work represented, has been closely associated with the direction of much of the rest, and whose authority to attempt to do justice to all the current knowledge on this subject must be unchallengeable.

Those who have been educated and entertained by Dr McMeekan as speaker and chairman at Ruakura Farmers' Conferences or at farm schools and other farmers' meetings throughout the country will find that the writing of this book has in no way cramped his inimitable style. A short biographical first chapter reveals some of the reasons for his facility in bringing the scientist's point of view into focus with the problems of practical farming.

The 23 chapters of his book deal with dairy farming in an ordered and logical sequence and cover all aspects that must be taken into account for success. There must be few farmers who would not find reading the book well worth while; for many it will be what they have long been waiting for: a clear, readable, and even enjoyable guide to what most of the dairy farming research to date means in terms of practical farming.

In paying tribute in a foreword to "the outstanding farmers' scientist of these times", Professor M. McG. Cooper says that Dr McMeekan "gets to the root of a problem and provides the substance that allows farmers to reason from first principles, so that they may work out their own salvation. This is the true meaning of agricultural education." Most farmers who read this book will endorse this opinion of another distinguished New Zealand agriculturist. —*G.J.N.*

"The New Zealand Dairy Exporter", Wellington. 30s.

J. D. J. Scott Asks Dairy Farmers:

What's Wrong with Your Production?

and Provides Solutions from Ruakura Experience

WAYS of finding the causes of low production from dairy herds and management methods to counter them formed the theme of a paper by J. D. J. Scott, Advisory Officer (Animal Husbandry), Department of Agriculture, Wellington, to the Ruakura Farmers' Conference in June in which he indicated practical ways of applying many of the results from research into dairy production at the Station. Diligent pursuit of the method advocated could lead on most dairy farms to economic progress even with present butterfat prices and costs. An adaptation of his paper follows.

AVERAGE production on dairying land in New Zealand is less than 200 lb of butterfat per acre. Yet many farms on good land are achieving 300 to 350 lb per acre. This means that on the best farms the income from butterfat alone is about 50 to 75 per cent higher than the average. Costs are not available, but it would be most surprising if the extra costs of producing at the highest level cancelled out the extra butterfat produced, because many overhead and running expenses are similar whether output is high or low. Thus it is very likely that the margin between income and costs is very much greater with high production, and this margin can still be a very worth-while one.

The best way out for the individual farmer or sharemilker struggling financially is to concentrate on increasing income in the most economical way possible. This is the aspect discussed in this article, but instead of income, butterfat production will be dealt with, because the two are virtually synonymous on most farms.

Production depends on very many factors and is low on different farms for different reasons. The first thing to do when attempting to increase production is to find out as accurately as possible the precise causes of low production. Efforts can then be concentrated on improving the factors that are limiting production most. By finding out what is wrong and doing first things first, you will largely overcome the dilemma of deciding what suggestions to follow, because each step will fall into line in order of importance.

High output of butterfat per acre is determined by

$$\frac{\text{Butterfat per cow} \times \text{No. of cows}}{\text{No. of acres}}$$

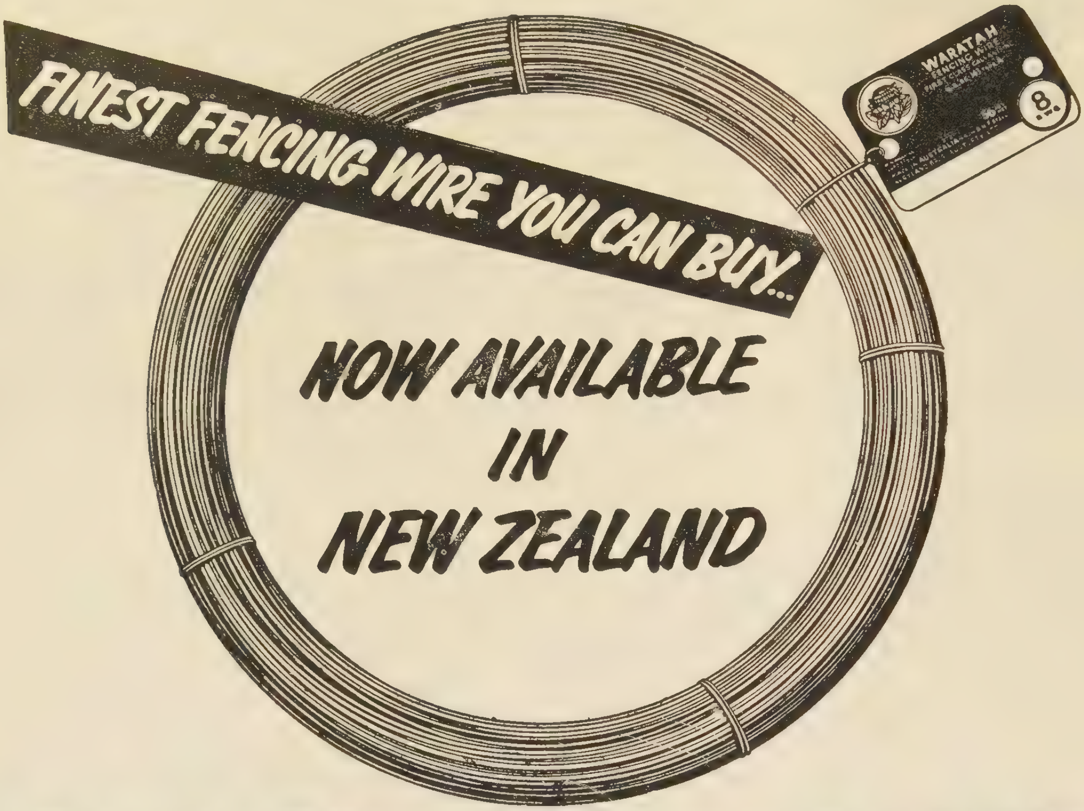
As the number of acres on a farm is fixed, a low output per acre will be due to a low output per cow, a low stocking rate, or both. As a low stocking rate and the different factors responsible for low production per cow leave definite symptoms, it should be possible, from a list and description of these, to assess whether stocking rate is too low and/or the causes of poor production per cow.

Low Stocking Rate

Taking into account average New Zealand production per cow and allowing for some mismanagement, poor milking, and disease outbreaks, a low stocking rate is probably the most important factor limiting higher production on most farms today. The chances are that about half the dairy farms in New Zealand have reached a stage where more cows could be carried. The symptoms of gross understocking are:

- Excess utilised pasture during the least growthy periods of the year.

Excess unutilised pasture in winter.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A swing toward cocksfoot-dominant pastures after understocking.

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- High condition of cattle, particularly when associated with high production per cow.

When all these are evident it is certain that too few cows are being carried and that production could be greatly increased with a higher stocking rate.

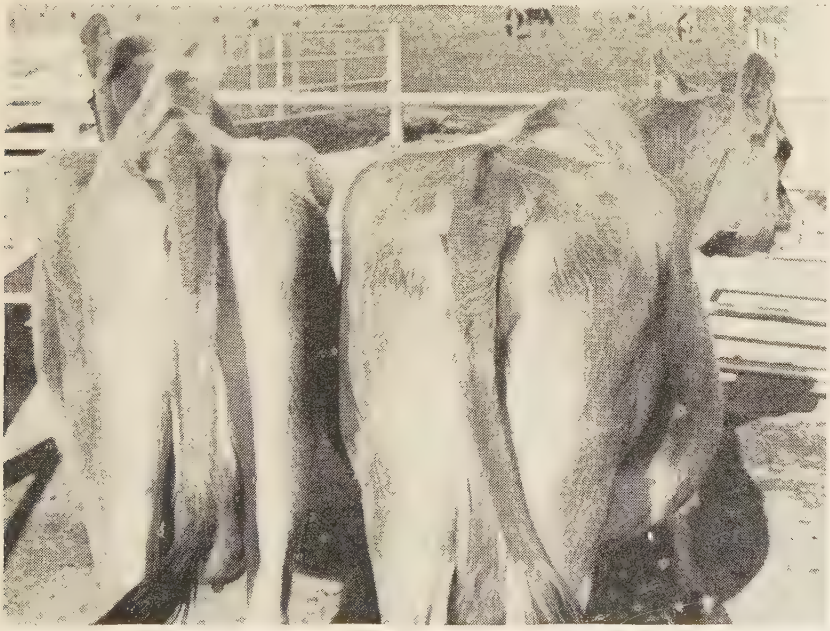
To pinpoint the symptoms of **mild** understocking is not quite so easy, because we cannot yet say precisely when the stocking rate should be increased. At present it appears that as long as cows are in reasonable condition at calving and are nearly fully fed until spring growth comes away, they will produce satisfactorily, and under these conditions they will produce more butterfat than a smaller, better fed herd. The best way of deciding whether you are understocked is to look closely at the condition of the cows and the feed supplies available on heavily stocked farms and compare these with your own.

Factors Affecting Production per Cow

From work at Ruakura we know that the production of a herd depends on:

1. The average age of the members.
2. The way it is fed, particularly just before and after calving.
3. The way it is handled in the shed.
4. The extent it suffers from disease.
5. The length of lactation.
6. Its breeding.

We also know that poor feeding and management rather than poor breeding are generally the main causes of low herd production, and that most herds under good conditions are capable of producing at least 350 lb of butterfat per cow.



Cattle in as poor condition as the cow on the left have been severely penalised in production.

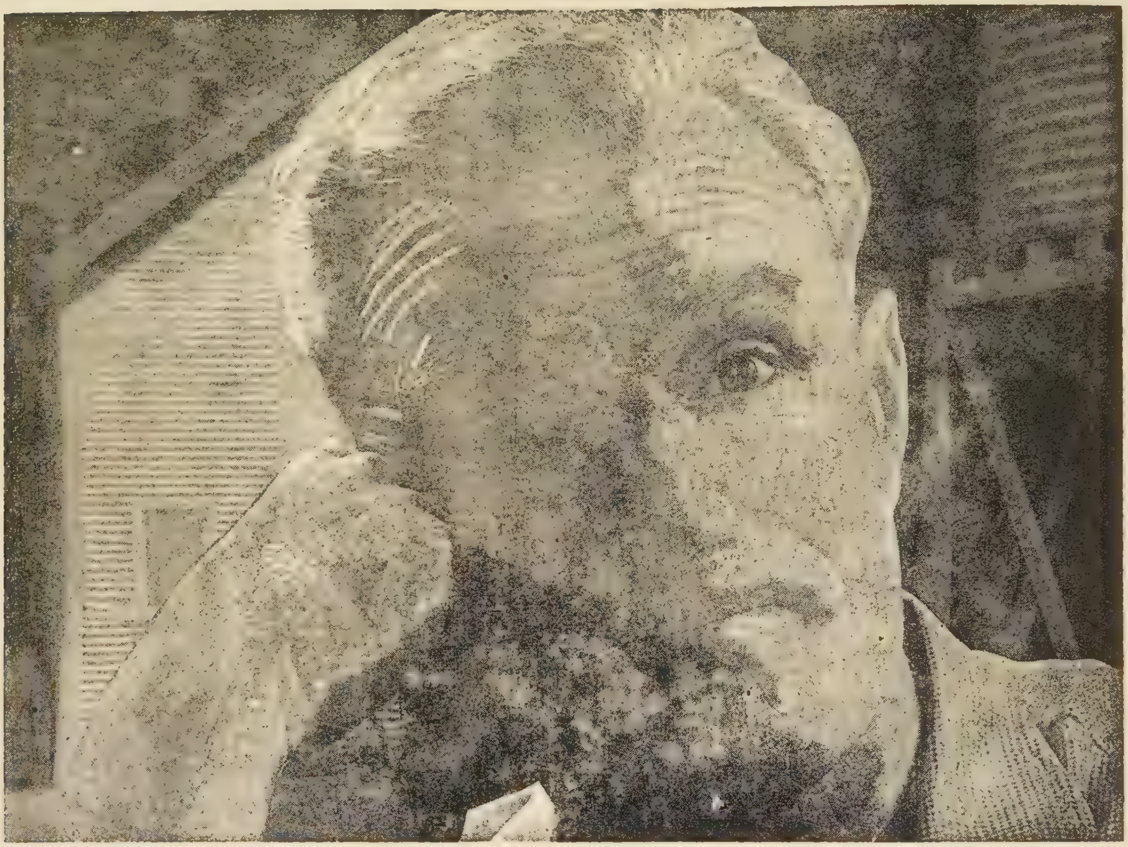
If a herd's production is low, this will be due to a fault in any of the six aspects mentioned or to a combination of them. Of these factors poor feeding, poor stock handling, and disease are the most important.

The most common form of poor feeding is underfeeding, and the loss in production from it depends on the degree of underfeeding. In severe cases, where cows are on very short rations and are drastically thin, the loss in production is over 100 lb per cow.

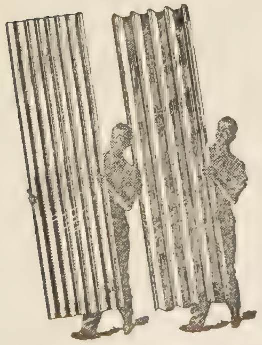
The loss in production due to poor handling of stock depends on the type and severity of mistreatment. Very rough handling produces an effect at least as great as severe underfeeding. The effect of a fault in technique is likely to vary considerably. Twins used in the experiment at Ruakura's No. 1 Dairy (see the September "Journal", page 221) lost about 70 lb of butterfat per cow through lack of stimulation. Because a fault in milking technique usually affects some cows severely, others less, and some not at all, the loss of production in herds where a poor technique is used will depend on the extent to which affected animals are culled and the extent to which replacements are affected. This in turn will depend on the sires used, because calves will be kept in the main from cows which are little affected. Overall, the loss will vary from quite large to very small amounts.

It is also not easy to estimate the loss in production through disease outbreaks. With mastitis one can make an estimate by counting the number of light quarters and considering that

all right, I'll buy it...



why are more and more farmers using Aluminium?



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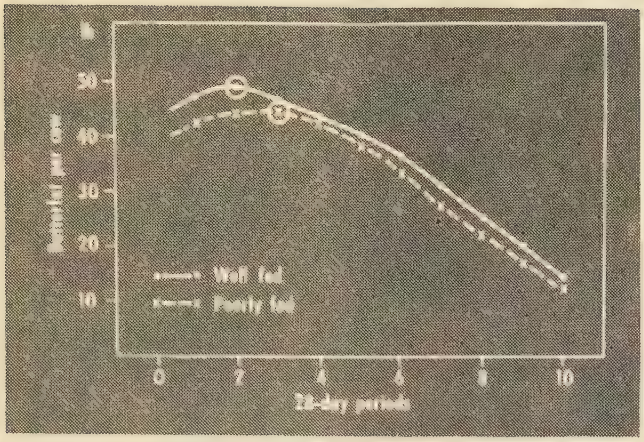
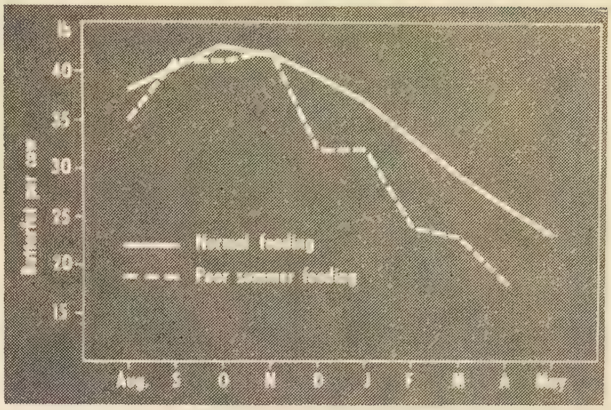


A late peak in production per cow points to inadequate feeding after calving.



A rapid decline in production with poor summer feeding.

each light quarter would lower production in an affected cow by 25 per cent. If this were correct, the loss of 40 quarters in a 100-cow herd would reduce production from 300 to 270 lb of butterfat per cow.

It is most important to have some idea of the likely gain in production that could be brought about by improving conditions. Without such an estimate it is not possible to decide on the course of action that should result in the best use of resources.

Underfeeding

A number of farms have been observed on which the cattle have been drastically short of feed for a number of winters in succession, so some description of the ways by which it is possible to estimate whether cows have been underfed or not seems justified. These are:

1. Where feed supplied falls far short of requirements, particularly during winter

At Ruakura we have found it necessary to supply about ⅓ acre of silage or hay or a combination of the two as well as at least ½ acre of autumn-saved pasture for each in-calf beast wintered at normal stocking rates.

For Jerseys before calving a daily maintenance ration is 60 to 70 lb of silage or 12 to 15 lb of hay per cow, or one acre of dense autumn-saved pasture about 9 in. long for 100 to 110 cows.

After calving 1 acre of similar autumn-saved pasture per day is required for every 80 cows.

Where these requirements are not met, cattle will be underfed; and the severity of underfeeding and its consequences will increase as the margin between requirements and the amount provided increases.

2. Where the cows are light in weight and thin

In a Ruakura experiment in which cattle were fed at different levels before calving the poorly fed cattle produced 50 lb of butterfat per cow less than the others, even though they were all fed alike after calving.

Few farmers would know how much their cattle weigh and I would not like to suggest that there is a universal minimum weight which all cattle must reach for satisfactory production. Any such critical weight would almost certainly vary from herd to herd according to the quality of the cattle, climatic conditions, and probably a host of other factors.

However, any reasonably observant stock man can use the condition of his cattle as a guide for determining whether they are underfed or not. Illustrated on page 163 is a typical member of the heavily stocked uncontrolled grazed Ruakura No. 2 Dairy herd alongside a cow in good condition. One can be quite sure that cattle in as poor condition as the cow on the left have been severely penalised in production.

3. Where a proportion of fat cows is found in a herd in late spring

This could be indicative of a short, severe period of underfeeding after calving. In two groups of cattle, one underfed for eight weeks after calving and the other receiving no check, the underfed cattle surpassed in weight those which were well fed all the time.

4. Where the peak production per cow is not reached until late in the season (late October, November, or December)

Illustrated at left above are lactation curves for 13 successive seasons of two groups of cows at the Ruakura No. 2 Dairy. The upper line shows the production of the well wintered cows and the lower curve the production of the cows which were at least moderately underfed before and after calving. The interesting point is that the well fed cows reached peak production per cow (circle on curve) four weeks earlier.

5. Where the fall-off in production during summer is very rapid

In the upper line of the graph at right above a normal fall-off in production from last year's tested herds in the Auckland area is compared with the curve for a property subject to severe summer dry spells. On this farm the milking methods appeared quite satisfactory and samples of the stock produced normally when better fed.

There is a danger, though, of attributing a sharp drop in production like this solely to poor feeding, whereas poor milking could be a contributing factor. The effect of poor feeding is likely to be accentuated by poor milking or poor stock handling.

6. Where many full-term calves from mature cows are classified as "skinners" or weigh just over 50 lb, especially if they are receiving a large milk ration

In the trial mentioned earlier, where cows were fed at different levels before calving, the birth weights of the calves from the underfed cows

increasingly

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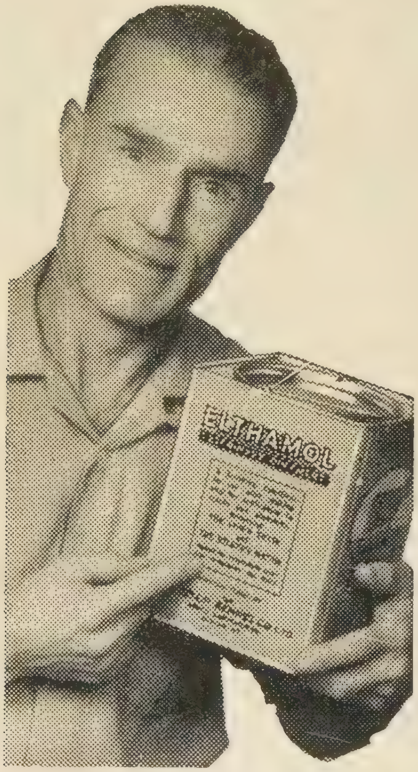

that special attention to cows' teats and udders will produce better results.

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were 3 to 6 lb below those of the others. Normal Jersey calves should weigh about 56 lb at birth and a little more as bobby calves.

Faults in Stock Handling

Poor stock-handling and milking methods likewise can often be recognised from their direct and indirect effects on animals. Under the following situations there is very likely to be something wrong with stock-handling and milking techniques:

1. Where a high proportion of the cows are nervous or need to be leg roped

The only cows which may need leg roping are those with very sore teats or (very rarely) highly excitable beasts, particularly those purchased from other herds.

2. Where a number of cows occasionally do not let down their milk, or have two or more short let-downs, or still have a lot of milk in the udder at the conclusion of milking

3. Where there is a proportion of fat cows in a herd from late spring

In an experiment by D. S. M. Phillips at Ruakura (see the September "Journal", page 221) stimulated, well milked cows put on appreciably less weight in the first five months after calving than some of the poorly milked cows in the same herd, despite the fact that some of the latter were dried off early and were put on store rations. Illustrated on this page are a pair of twins which show this effect.

The twin on the left was milked poorly and consequently produced less and put on weight.

4. Where there is great variability in the performance of two-year-olds and where more than an odd one or two dry off early for no apparent reason

Poor milking techniques commonly affect only a proportion of cattle and in doing so increase the variability between cows.

5. Where there is a rapid decline in production once the peak has been passed, particularly where feed is plentiful

Any of the above symptoms of poor milking could be due to faulty machines, and these should be checked to see whether they are in any way to blame.

Disease

Diseases can severely affect production, but most of them have very distinct symptoms and the common ones are well known to cowmen. Infertility in the broad sense and mastitis are probably the two which cause most production trouble, though in individual herds a number of others can severely depress output.

Control measures that can be fitted into a farm management programme are mentioned later.

Age of Cattle

As two- and three-year-olds produce about 23 per cent and 12 per cent respectively less than mature cows, and production normally declines in cows over eight years old, production in any herd with a high proportion of young or old cows will be lower than normal. A well farmed group of two-year-olds, though, should still be capable of producing more than 300 lb of butterfat per cow.

Lactation Length

The seasonal production of a herd depends not only on the average daily production, but on the number of days it is kept in milk. Production is reduced by premature drying-off, though this cause of loss and its approximate extent are easily recognised and measured.

Breeding

Assessing whether the breeding of an individual herd is limiting production to a level well below the normal potential is not so easy. Poor breeding is seldom the cause of low herd production. This does not mean that poor cows do not exist; very few herds are without a proportion of them. It does mean, though, that only seldom is a whole herd comprised of such cows; one might be unlucky and be landed with trash a dealer has collected or use a series of very poor bulls in succession. How rarely this happens can be gauged from the fact that from bulls with no performance records at all, only once in about 2,500 cases would two bulls with a rating of minus 35 lb of butterfat or poorer be used in succession. Even if it did happen, the full effect would be realised only if all the calves entering the herd were by these bulls, and this would take 10 to 12 years.

One would, of course, suspect that too high a proportion of the cows in a herd were of poor quality if they were not producing well despite very high standards of feeding and milking and a low incidence of disease. A second opinion should be obtained, however, before a large proportion of a herd is discarded and replaced because of suspected low quality.

Making Use of Information

Having carried out all these investigations, how does one make use of the information obtained? The whole purpose of finding the actual cause or

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TENAC — The answer to your "sticky" problem

TENAC FOR APPLICATION WITH	TO CONTROL WEEDS OR OTHER PESTS	SPRAY MATERIALS TO USE	AMOUNT OF TENAC	COMMENTS
WEEDKILLERS	GORSE BLACKBERRY BROOM FENNEL and other Woody Weeds	TENAC with SHELL Weedkiller "B" (Ester 2,4,5-T)	The amount of TENAC added to the WEEDKILLER or FUNGICIDE spray mixture depends upon the spray volume to be applied. (a.) 100 gallons or more per acre. Use 1 pint TENAC in each 100 gallons of spray mixture. (b.) Less than 100 gallons per acre. Use 1 pint TENAC in each 50 gallons of spray mixture. (c.) When applying INSECTICIDES use ½ pint TENAC in each 50 gallons of spray mixture.	WEEDKILLERS COVER AND PENETRATE PLANTS BETTER, LAST LONGER WITH TENAC. The better a plant is covered with spray the greater the absorption of WEEDKILLER. TENAC spreads the spray and in addition prevents the weathering of the killing ingredient.
	WILLOWS	TENAC with SHELL Weedkiller "E" (Ester 2,4-D)		
	RUSHES	TENAC with SHELL Weedkiller "D" (Amine 2,4-D)		
FUNGICIDES	LATE BLIGHT of POTATOES and TOMATOES RUSTS MILDEWS LEAF SPOTS of VEGETABLES	TENAC with Copper or Preferred Fungicide		FUNGICIDES FORM A COMPLETE PROTECTIVE PLANT COVER WITH TENAC. Fungicide spray deposits resist rain, wind, and plant rubbing, when TENAC is added to the spray.
INSECTICIDES	POTATO TUBER MOTH (Potato Worm)	TENAC with DIELDREX 15		INSECTICIDES LEAVE NO PARTS UNPROTECTED WHEN USED WITH TENAC. AS TENAC increases the persistance of insecticides, do not use on edible parts of plants.

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causes of low production is to make sure that finance and labour, when they are short, are concentrated on improving the aspects which are limiting production most and which will provide the greatest return from invested money and time.

Final decisions on what to concentrate on first will be soundly based if each proposed step is considered carefully in regard to its necessity, its cost, and its likely benefits. This may sound very difficult, but because improvement of some unsatisfactory aspects can be made at little cost, and other weaknesses must be concentrated on to avoid disaster, deciding on what to do first does not necessarily require extraordinary skill.

The following rules can be applied generally:

1 Make sure that a minimum of butterfat is lost in the shed through faulty milking and handling. It costs very little more to milk cows properly than to milk them poorly, and all other efforts to increase production will be of little avail if cows leave the shed with a good proportion of what they have produced.

2 If an easily spread disease or one which could have a serious effect on production (such as mastitis or infertility) occurs, concentrate on control before the disease gets out of hand. Advice from a veterinarian should be sought on the best method of doing this. The elimination or control of a disease which is probably not so readily spread and which probably does not affect production much should wait its turn on the list of priorities.

Unconsumed and unconserved feed in late spring.

3 Whether it is suspected that low production is due to poor breeding or not, use artificial breeding, because it confers greater production advantages than any other breeding policy. Use of artificial breeding on almost all properties can be justified on the grounds that it is as cheap as natural mating with normal priced bulls, but anyone who does not use it because any extra money expended might be better spent on something else should reduce breeding costs to a minimum by obtaining bull calves at near-bobby prices from top cows in a herd by high-rating sires.

4 Where low production is partly due to premature drying off remember that reasonably well fed cows probably need a spell of no longer than eight weeks. Allowing them to remain dry for longer than this is unlikely to improve returns from them in their subsequent lactation. The advantages of any extra work done or a holiday in autumn through early drying off should be weighed against the probable loss in production.

5 Where symptoms of understocking are found carry more cows unless consequent costs, particularly labour, are prohibitive. Every farmer pays dearly for the grass he grows and unless he carries sufficient stock, some of it will not be used or much of it will be used poorly.

Where scope exists, increasing the number of cows carried is the most effective way of increasing output. Production gains are achieved almost immediately and are commonly much greater than those obtained by improving nutrition for a smaller herd. Further, expenditure on extra cows is unlike that on other items, such as fertiliser or a drain. Cows are a much more tangible asset and one that can be realised on if necessary.

(Continued at the bottom of page 170)

← A waste of valuable autumn pasture at the end of lactation.

Grading Points for Export Butter and Cheese

Contributed by the Dairy Division

BUTTER-MANUFACTURING companies which obtained an average grade of 93.75 points or more and cheese-manufacturing companies which obtained an average grade of 92.50 points or more during the year ended 31 July 1960 are listed below in order of merit. Of the total listed, 31 butter factories and 22 cheese factories are in the North Island and the remaining two butter factories and four cheese factories are in the South Island.

Creamery Butter

Factory	Registered number	Brand	Production tons	Graded for export tons	Average grade points	Grading port
Konini	1,203	Konini	2,652	1,762	94.561	Wellington
Cheltenham	3	Pakeha	1,385	627	94.460	Wellington
United	1,296	Whariti	471	96	94.337	Wellington
Ngatea	291	Anchor	3,882	3,733	94.226	Auckland
Stratford	68	Stratford	2,266	1,843	94.224	New Plymouth
Kuku-Manakau	905	Ohau	502	387	94.176	Wellington
Moa Farmers'	341	Inglewood	2,240	1,802	94.149	New Plymouth
Mangorei	345	Mangorei	1,198	749	94.148	New Plymouth
Morrinsville	330	Lockerbie	6,259	5,957	94.137	Auckland
Midhirst	110	Rugby	1,950	1,747	94.119	New Plymouth
Levin	910	Lake	1,632	579	94.038	Wellington
Awahuri	664	Red Rose	1,158	359	94.006	Wellington
Rangitikei	1,360	Rangitikei	1,054	647	94.005	Wellington
Taupiri	22	Anchor	4,072	1,579	93.955	Auckland
Shannon	1,489	Shannon	1,755	936	93.946	Wellington
Cape Egmont	632	Cape Egmont	1,277	1,280	93.934	New Plymouth
Omata	82	Omata	719	708	93.929	New Plymouth
Golden Coast	197	Golden Coast	690	18	93.915	Lyttelton
Cambridge	1,239	Cambridge	4,395	1,926	93.907	Auckland
Kairanga	1,768	Longburn	1,647	976	93.870	Wellington
Okitu	1,270	Okitu	151	77	93.863	Gisborne
Rangitaiki Plains	133	Rangitaiki Plains	7,842	6,039	93.858	Auckland
Morrinsville	415	Anchor	3,346	3,334	93.856	Auckland
Wangaehu	1,326	Wangaehu	567	377	93.838	Wellington
Inter-Wanganui	6	Inter-Wanganui	490	490	93.834	Lyttelton
Te Awamutu	397	Lotus	3,193	1,818	93.833	Auckland
Waitoa	91	Anchor	6,996	6,758	93.831	Auckland
Northern Wairoa	1,358	Northern Wairoa	4,566	4,381	93.826	Auckland
Rodney	394	Rodney	819	803	93.802	Auckland
Okau	872	Okau	198	194	93.777	New Plymouth
Tirau	95	Anchor	5,662	3,932	93.774	Auckland
Bay of Plenty	1,399	Bay of Plenty	4,813	4,675	93.754	Auckland
Bay of Islands	1,312	Bay of Islands	5,373	4,882	93.752	Auckland

Other butter companies whose butter was graded mainly for the local market and for which an average grade of 93.75 points or more was obtained for the combined local and export gradings were as follows:

Factory	Registered number	Brand	Production tons	Graded for export tons	Average grade points	Grading port
Kaikoura	302	Kai	589	384	94.241	Lyttelton
Murchison	1,888	Airship	542	427	94.211	Lyttelton
Inter-Wanganui	6	Inter-Wanganui	490	325	94.130	Lyttelton
Karamea	1,570	Karamea	472	374	94.020	Lyttelton
Golden Coast	197	Golden Coast	690	113	93.901	Lyttelton
Westland	145	Westland	970	763	93.844	Lyttelton

Cheese

Factory	Registered number	Brand	Production tons	Graded for export tons	Average grade points	Grading port
Oxford	15	Oxford	598	577	93.188	New Plymouth
Alton	1,890	Alton	810	816	93.108	Patea
Westmere	1,621	Westmere	465	468	92.975	Wellington
Riverbank	985	Riverbank	666	590	92.940	Wellington
Kai-Iwi	1,565	Kai-Iwi	193	228	92.924	New Plymouth
Waihi	144	Anchor	1,575	1,294	92.889	Auckland
Brooklands	1,619	Brooklands	509	492	92.880	New Plymouth
Normanby	24	Steering Wheel	1,204	1,196	92.868	New Plymouth
Joll	1,862	Maori Chief	1,213	548	92.818	New Plymouth
Lepperton	49	Lepperton	965	885	92.787	New Plymouth
Awatuna	60	Awatuna	1,157	1,147	92.745	New Plymouth
Thornbury	1,581	Thornbury	193	193	92.719	Bluff
Bell Block	71	Bell Block	515	520	92.673	New Plymouth
Tariki	1,818	Tariki	963	460	92.650	New Plymouth
Seaward Downs	702	Seaward Downs	391	392	92 644	Bluff
Lowgarth	629	Lowgarth	844	843	92.643	New Plymouth
Eltham	1,039	Eltham	282	276	92.609	New Plymouth
Kaupokonui	1,100	Kaupokonui	680	682	92.547	New Plymouth
Pukekura	153	Anchor	918	729	92.544	Auckland
Kairanga	184	Fitzherbert	218	52	92.540	Wellington
Island	72	Island	382	386	92.536	Bluff
Okains Bay	239	Okains Bay	242	149	92.535	Lyttelton
Awatuna	1,622	Awatuna	1,151	1,146	92.531	New Plymouth
Whenuakura	1,237	Whenuakura	925	939	92 515	Patea
Okato	57	Okato	937	475	92.514	New Plymouth
Eltham	1,046	Eltham	387	383	92.511	New Plymouth

☆

What's Wrong with Your Production?

(Continued from page 169)

6 Where inadequate feeding appears to be limiting production a further investigation is needed to decide whether the lack of feed is due to mismanagement of available supplies or insufficient growth.

Symptoms of mismanagement are surplus unconsumed feed in late spring and the squandering of large quantities of autumn growth by dry cows or ones at the end of lactation. Often underfeeding can be avoided if more spring growth is conserved as silage or hay and more autumn growth is saved for late winter use. Sometimes, as the result of better management, not only can the existing cows be fed well but the herd can be increased.

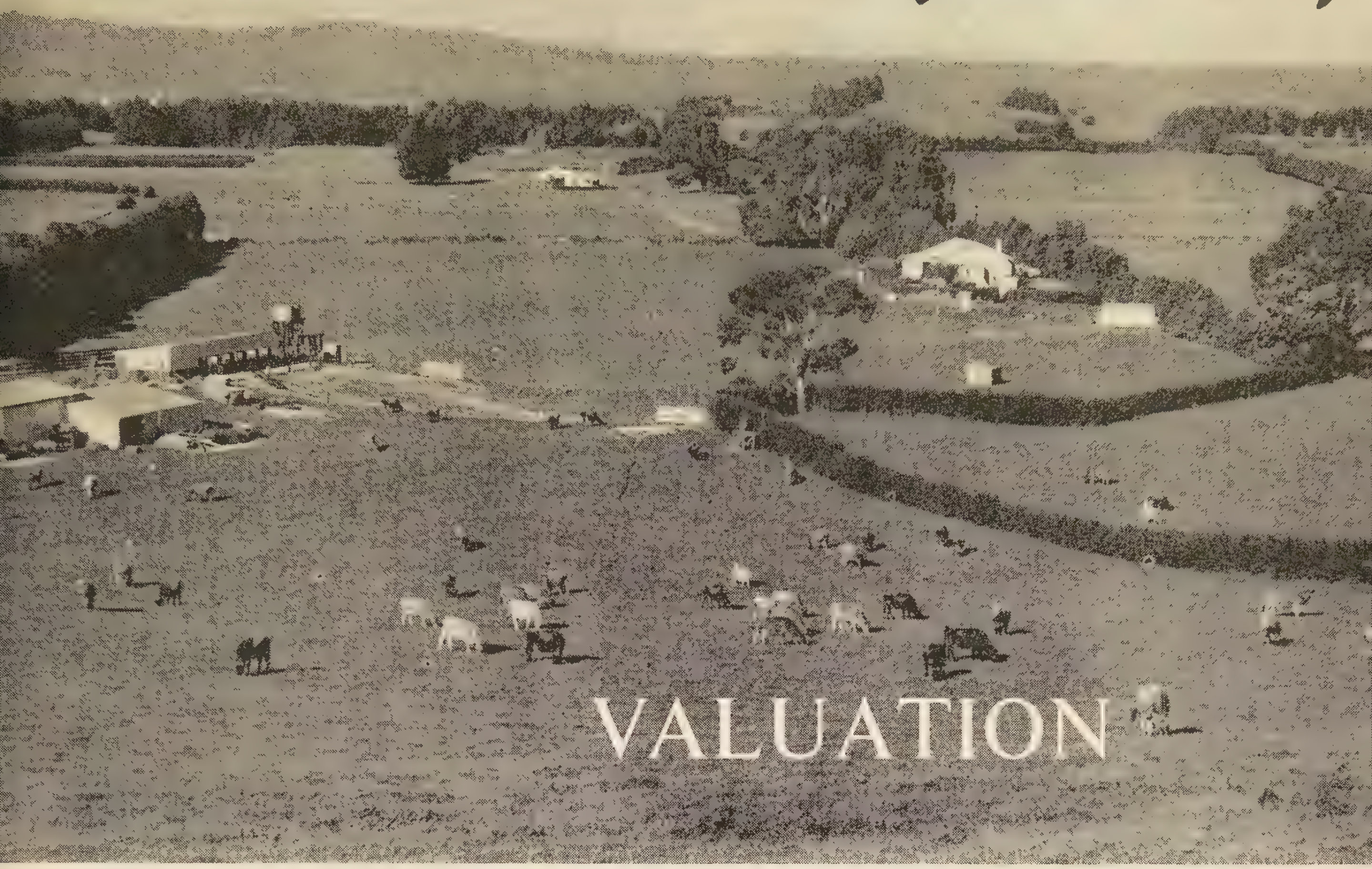
If underfeeding is due to insufficient growth, the contributing causes should be determined. They may be low fertility, poor pasture species, insects, weeds, or excessive wetness or dryness. Department of Agriculture Farm Advisory Officers or Dairy Board Consulting Officers are well qualified to give advice on these problems.

Recent work at Ruakura suggests that heavy expenditure on fencing and water supply is not warranted if the aim is merely to grow more feed. Anyone with limited finance would be better advised to spend the money available on one or more of the other methods for growing extra pasture rather than to subdivide intensively.

7 For dairy farmers who are interested in pigs and who have suitable by-production available, more intensive pig production can at times be more rewarding than a similar effort aimed at improving dairy production. Pigs well housed and managed can net £8 to £10 per cow. It often pays to delay farm improvement at certain stages so that the earning capacity of pigs can be realised.

If the method outlined is followed and pursued diligently—the method of finding out what is wrong with production and concentrating first on improvement of conditions which limit production most—economic progress can be made on most dairy farms, even with butterfat at 2s. 8d. per pound and present costs.

The Business Side of Farming



VALUATION

By J. P. J. TWOMEY,

Farm Advisory Officer (Economics), Department of Agriculture, Christchurch

THE Government Valuer and the valuations he makes have an important place in the farming economy, so perhaps it is advisable that some of the basic principles should be understood.

GOVERNMENT valuations of every property in New Zealand are made under the Valuation of Land Act 1951.

The statutory officer who administers this Act is the Valuer-General, who is required to prepare district valuation rolls containing the following particulars of each property:

1. Name of owner.
2. Name of occupier.
3. The legal description and area of the land.
4. The capital value, the unimproved value, and the value of the improvements of the property.

Copies of these rolls are supplied to and maintained for local authorities for use in their rating systems.

The Valuer-General is required to revise the values for each district roll at intervals not greater than five years. When necessary postponement of revaluations beyond five years can be made by Order-in-Council. There is provision for keeping a roll up to date during its currency by the addition or deletion of improvements and recording of changes of ownership or occupancy and subdivision of the land.

Fundamental Valuation Terms

"Capital value" is defined in the 1951 Act as the sum a bona fide seller might expect to receive for his property at the time of valuation if it were offered for sale free of mortgage and on such reasonable terms and conditions as he might be expected to require.

The "unimproved value" is also defined in this Act as the sum a vendor might expect to receive for his property at the time of valuation if it were offered for sale on reasonable terms and conditions and free of mortgage and if no improvements had been made on the land. The term "improvements" includes, broadly, work done or material used on or for the benefit of the land by the

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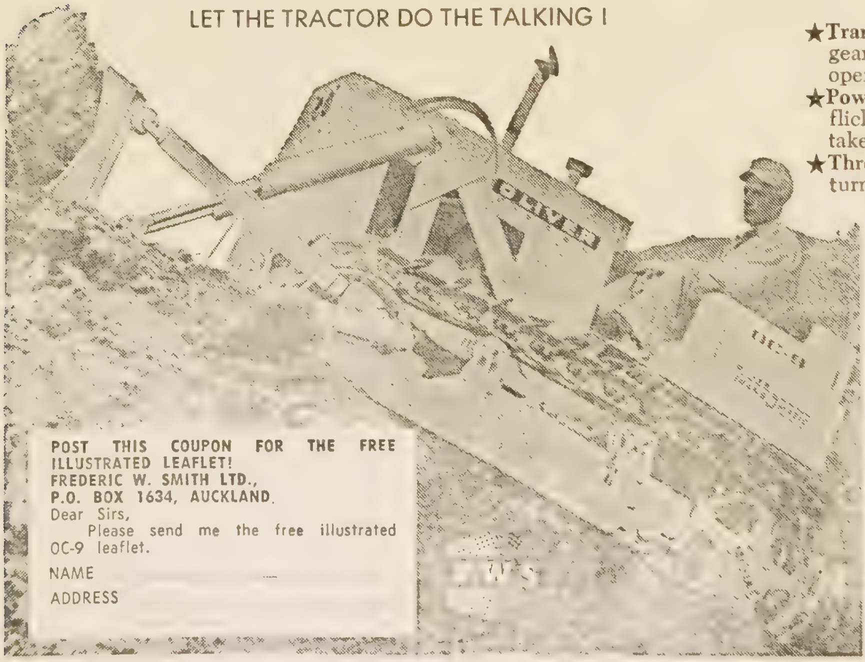

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expenditure of capital or labour by any owner or occupier. Improvements to be reckoned as such must increase the value of the land and be unexhausted at the time of valuation.

Right of Entry to Properties

The Valuation of Land Act provides for the right of entry by the District Valuer or any officer or valuer appointed or employed by the Valuer-General for making a valuation.

Owners, occupiers, or managers are required to answer any questions put to them by the valuer and generally to afford all the necessary information to enable a correct valuation to be made.

Penalties can be imposed for refusals to answer relevant questions or to give information.

Basis of Valuation

The underlying principle of the legislation has always been "free market value". This is the fair price from an assumed sale between free and willing parties neither of whom is compelled to act in haste whether selling or buying. This means that values will not be based on highly speculative purchases or unreasonably high sales at one end of the scale or on forced sales where the consideration is unreasonably low.

All sales of land are recorded and studied by the Valuation Department. One of the main aims is to see that all valuations in a particular local body district made at the one date are relatively uniform.

Perhaps the main consideration in assessing rural land values is the production or earning capacity, which is, in most cases, the salient factor in "fair selling value". Other important considerations are the adaptability of a property to a possible changed production usage; suitability for its present production use; the locality; ease of management; the state of the non-productive improvements, and the general attractiveness of the farm as a home, with any hazards, risks, and disabilities of management which may affect the market value of the property.

Productivity alone will rarely give a correct interpretation of "fair market value". Returns from farm properties in relation to capital value of the farm vary considerably.

Alteration to District Valuation Rolls

Between one valuation roll revision and the next the Valuer-General may make alterations and additions which are necessary to correct valuations and entries whenever they have been found inaccurate as a result of

1. "Improvements" having been added to or removed from the land;
2. Any change in the ownership or occupancy of the land;
3. Any land being omitted from the roll;
4. The description of the land or the name of the owner being wrong;
5. Any subdivision of the land.

Objections and Remedies

All valuations issued under the main provisions of the Valuation of Land Act 1951 carry with them rights of objection by owners of freehold properties and by lessors and/or lessees of leasehold properties. Generally the grounds of objection must be that the values are not in accordance with the provisions and definitions contained in the legislation. The only really acceptable ground for an objection is that the new valuation does not represent what the property might be expected to realise at the time of valuation if offered for sale under reasonable terms and conditions.

Objections to Revised Values of District Rolls

After a general revision of valuations in a country all owners and occupiers receive notices informing them of the new valuations and of the time within which any objections to those valuations may be lodged.

During this period officers of the Valuation Department are available at branch offices and other centres within the revalued district to discuss the revised values with property owners.

Handling of Objections

The Valuer-General refers any objections to his District Valuers for reconsideration. He may then decide (1) of his own motion to refer the objection to the Land Valuation Court, (2) to alter the valuation to the extent claimed, (3) to alter the valuation to such extent as is agreed on with the objector, or (4) to decline to alter the valuation. If this decision is either (2), (3), or (4), he serves notice of it on the objector, and on the owner if other than the objector. Either of these may notify the Valuer-General within the specified time that he desires the objection to be heard by the local Land Valuation Committee. If no such notice is received, the Valuer-General's decision is deemed to be assented to and the roll is amended, if necessary, to give effect to his decision.

Any objection heard and determined by the Land Valuation Committee is subject to appeal to the Land Valuation Court, whose verdict is final except on points of law, which may be referred to the Court of Appeal.

Any owner who has objected to a valuation made at a revision of a district roll and is not satisfied with the value of the land as fixed by the Land Valuation Court's order may, within 14 days of the sealing of the order, give notice to the Valuer-General that he requires the capital value to be reduced to the value which he (the owner) considers to be the fair selling value as specified in his notice (but not less than the aggregate amount owing on mortgages or other charges on the land), or the land to be acquired on behalf of Her Majesty, or sold, at that value. If no buyer can be found, the Valuer-General must reduce the valuation to that of the objector.

There is also provision that if the Valuer-General considers that the value has been fixed by the Court at less than the capital value, he may, within 14 days after the sealing of the Court's order, require the owner to consent to what he (the Valuer-General) considers is the fair capital value, and if such consent is not given within 30 days after notice is delivered, he may, with the approval of the Governor-General in Council, acquire the property at that value on behalf of Her Majesty. It is many years since this particular provision was operated.

New Valuations during Currency of Roll

An owner, on payment of the prescribed fee, may request the Valuer-General to make a new valuation of his land during the currency of the valuation roll.

This new valuation (to be used for rating and land tax purposes) is required to preserve uniformity with existing roll values of comparable parcels of land, and the right of objection is limited accordingly.

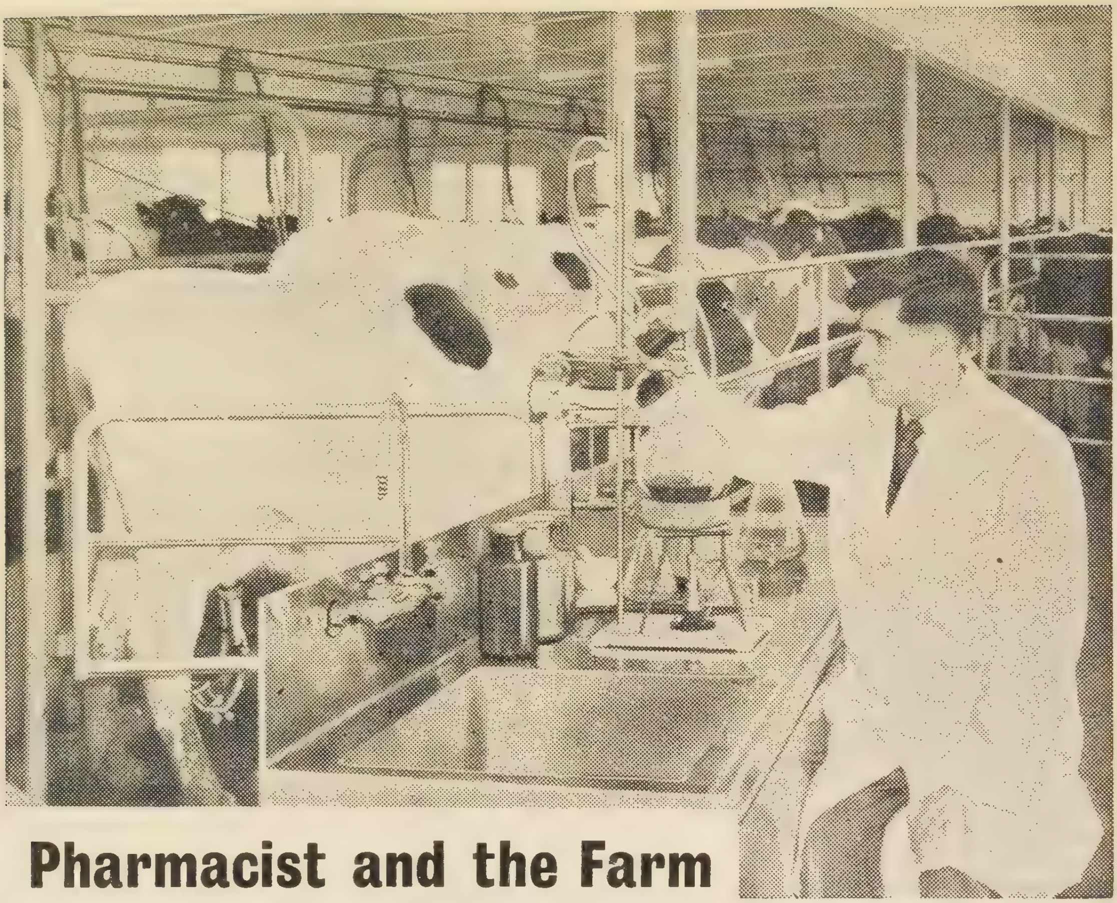
Availability of Copies of Entries in District Rolls

Any person, on application on the prescribed form and on the payment of a fee, may obtain a certified copy of any entry in the district valuation roll.

If the copy of the valuation is required by a trustee in connection with an investment of trust funds, it is the duty of the Valuer-General to satisfy himself that the entry is correct as to the then value. The valuation so supplied is deemed to be a competent valuer's report within the meaning of the Trustee Act 1956.

Acknowledgment

The author acknowledges the help given by the Valuer-General and members of his staff.



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To Produce Good Litters in Spring

In-pig Sows Need Sound Management Now

By I. H. OWTRAM,
Extension Officer in Pig Husbandry, Department of Agriculture,
Wellington

FARMING is a business in which it is always necessary to look well ahead. Work done today brings its success or failure in the months to come. This is particularly true of in-pig sows. Their management at this time of year has a considerable effect on the size and numbers of piglets that will be produced when they farrow in May and June next.

ON the dairy farm where pigs are bred all the breeding sows should have been mated about a month ago. During this month they ought to have been regaining some of the condition lost while they were suckling their last litter. To do this they should have been getting about 6 food units, or 6 gallons of skim milk, a day in addition to grazing, which may not be of much value at this time of year.

This replacing of condition lost while the sow is suckling is a very important point in her management. It has a considerable influence on the number of pigs farrowed in the next litter. On the average 18 to 24 fertilised ova are present after mating, yet at farrowing 12 live pigs are considered a very good result; the average number is much lower.

One of the reasons for this is that a number of the fertilised ova never get a start, and a frequent cause is that the sow is not getting enough food to maintain herself and supply the coming litter.

The owner can assist by giving her enough food to enable her to put on the condition lost.

If plenty of skim milk is available, the sow can be given some 6 gallons per day and allowed free range on as good grazing as is possible. If properly ringed with a small copper ring placed in the septum (division between the nostrils) in the same way as a bull is ringed, sows will do no damage to pasture.

Use of Meal Mixtures

At this time of year the supply of skim milk is becoming less and if a number of pigs are on hand in the fattening pens, and there is not quite enough skim milk to go round, the dry sows generally get the short rations. There should be no hesitation in supplementing the dry sows' ration with a good meal mixture, at least a quarter of which should be rich in protein. A suitable mixture would be 1 part of buttermilk powder, 1 part of meat meal, and 8 parts of barley meal. Money spent on such feeding will result in more pigs at the next farrowing.

If skim milk is in short supply and crops have been grown for the pigs, they can be used to feed in-pig sows provided they are supplemented with meal. At this time of year crops that are likely to be available are carrots, early pumpkins, and to a limited extent perhaps sugar beet.

Green lucerne is also useful and can be successfully grazed by pigs that are ringed. If, however, it is planned to cut the lucerne stand again, any that is used for the pigs will have to be cut and carted to them. Green lucerne is a very bulky food and the pigs should not be given more than they can clean up; otherwise considerable waste is involved.

Condition of Farrowing Houses

This is a most convenient time to do repairs and other maintenance and also to do any building required at the piggery. The weather is generally fine and the ground dry, so that there is no difficulty in getting material to the site.

When farrowing houses are empty the opportunity should be taken to

Lost weight must be replaced during the first six weeks after weaning. This sow is in good condition for farrowing.

wash them out thoroughly with strong disinfectant well ahead of the time they are next required. This makes certain that a house is completely dry before the next sow is put into it.

If artificial heat is installed in the farrowing houses, it is essential to check the apparatus to make certain it is in good working order. Where electrical infra-red heaters are used make sure that all connections are in good order, and check the lamps of bright emitters, which are easily damaged and may have burnt out.

A dull emitter is much more robust, but should be examined, and if a pilot light is used with it, this also should be checked. The height of the heater from the floor should be adjusted to give 75 degrees F at floor level under the lamp. The general level of temperature being lower in May and June than in November-December, heat lamps have to be nearer the floor to give this temperature.

Kerosene-burning infra-red heaters should be thoroughly cleaned and overhauled, particular attention being paid to the chains and hooks by which they are suspended. If one of these heaters falls, serious loss usually results; and by the time anyone gets there it is usually too late to salvage even a bit of roast pork.

The gates and doors of farrowing units should be in good order and the fastenings should be pig proof so that when the sow is shut in she remains shut in. Whole litters have been lost through the sow's being able to get a gate open and get out to farrow outside in inclement weather.

Attention to these points will pay a dividend at farrowing time. If jobs are done now, when time is available, they can be done properly, obviating urgent temporary repairs when the sow is farrowing. A good look over the farrowing quarters may reveal other things that need attention.

Sheep Dog Trials

NORTH ISLAND Sheep Dog Trial Association Centre championships will be held as follows:

Northland (Pouto S.D.T.C.), 28, 29, and 30 March; Waikato (Karioi S.D.T.C.), 16, 17, and 18 March; Main Trunk (Taumarunui C.C.), 23, 24, and 25 February; Taranaki (Wharehuia-Te Popo D.T.C.), Centre Huntaway Championships, 2, 3, and 4 March; (Cape Egmont Stock D.T.C.), Centre Heading Championships, 16, 17, and 18 March; Wanganui (Parapara-Makirikiri S.D.T.C.), 4, 5, and 6 May; Wairarapa and Southern Hawke's Bay (East Coast S.D.T.C.), 5, 6, and 7 April; Hawke's Bay (Takapau S.T.D.C.), 26, 27, and 28 April; Poverty Bay (Tolaga Bay S.D.T.C.), 22, 23, and 24 March.

South Island centre championships will be held as follows:

Marlborough - Nelson (Waimea C.D.T.C.), 20, 21, and 22 April; Canterbury (Hilton Gapes Valley C.D.C.), 19, 20, 21, and 22 April; North Otago (St. Bathans), 18, 19, and 20 May; Otago (Wakatipu), 6, 7, and 8 April; Southland (Waiau), 26 and 27 June.

"Open Day" at Massey

MASSEY AGRICULTURAL COLLEGE, Palmerston North, will be open to the public on Saturday 18 March from 10 a.m. to 4 p.m.

Staff and students will be present to explain demonstrations and displays of farm machinery, crop and pasture trials, the herringbone milking system, work at the research piggery, the intensive dairy production unit, horticulture and poultry divisions, the sheep husbandry department, and stock on the College farms. The science and research laboratories will display a wide range of equipment used in research and teaching.

The Dairy Research Institute at the College will also be open to visitors in conjunction with demonstrations in the college dairy factory. Transport will be available on the 1,200 acre farm property, light refreshments will be available, and a special bus service will run from Palmerston North. Massey College is a mile from Palmerston North on the Palmerston North-Shannon-Levin highway.

Use of Chemicals for Control of Weeds

USERS of chemical weedkillers or those contemplating their use, will find the new edition of the Department of Agriculture's Bulletin No. 329, "Chemical Methods of Weed Control", a practical guide in this modern, rather difficult field. Weed control methods have advanced rapidly in recent years and new materials with new qualities are continually appearing on the market. Expert advice on their use is set out clearly by L. J. Matthews, Principal Scientific Officer, Department of Agriculture, Wellington, in this latest edition of the bulletin.

So many weed problems exist in New Zealand that many different weedkillers are required and the tendency is to have a specific weedkiller for the control of a specific group of plants. Often when it is desirable to eliminate all vegetation, or all but one species, such as with crops, a combination of weedkillers is required.

The use of weedkillers depends on, in order of importance:

1. Determining the correct type of material or materials for a specific purpose.

2. Determining the correct stage of growth or time of application of the weedkiller.

3. Securing complete foliage cover or even distribution of the weedkiller.

4. Determining the right rate of application.

All these factors are dealt with in detail in the various sections which comprise: Principles of weed control, chemical weedkillers and their properties, control of specific weeds, weed control in specific areas, and application of weedkillers.

The bulletin, of 200 well-illustrated pages, including 12 pages of coloured illustrations of major weed species, is available at 3s. a copy from offices of the Department of Agriculture.

▲ View across the ring plain that lies between the slopes of Mt. Egmont and the coast. The hummocks are characteristic of this volcanically formed countryside and were one of the problems in development of Mr Stronge's property.

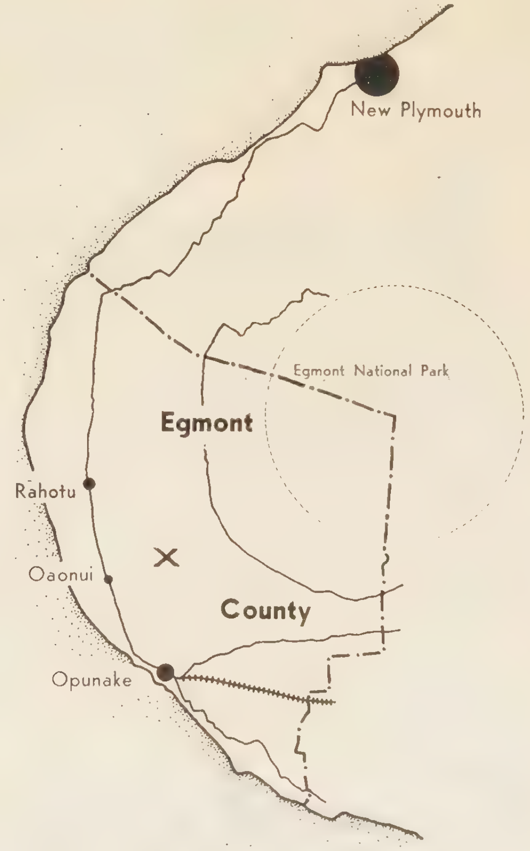
Studies in Farm Management

Farm Development in the Egmont County

By G. R. MOSS, Farm Advisory Officer, New Plymouth, and A. C. BURGESS, Assistant Fields Superintendent, Palmerston North, both of the Department of Agriculture

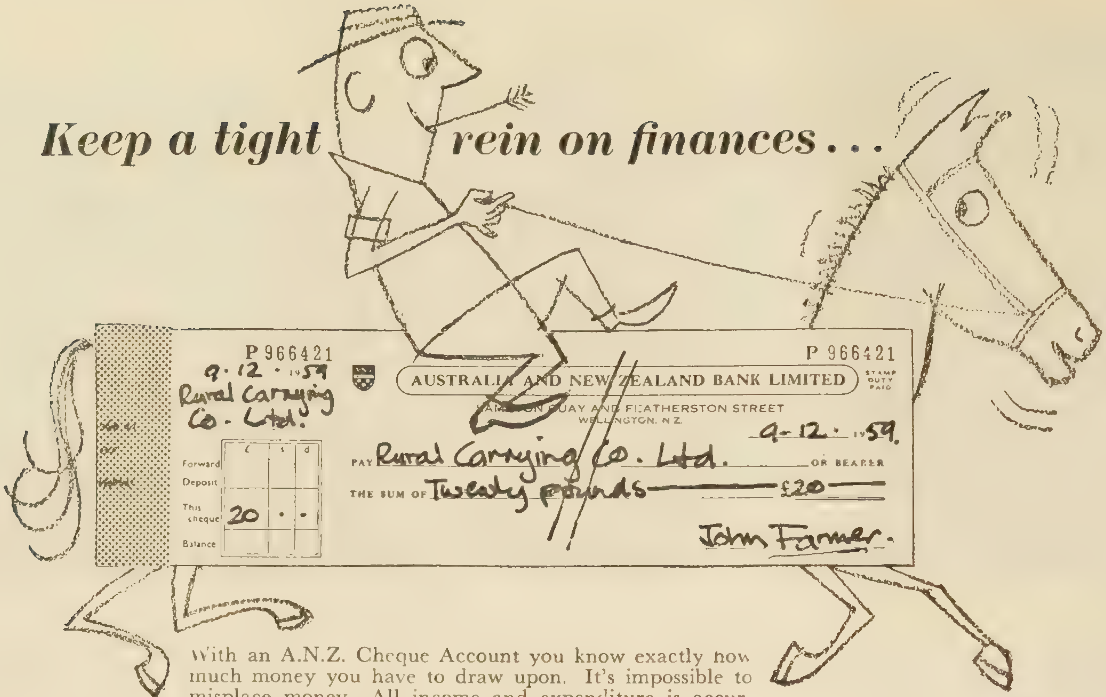
HOW do we measure farm efficiency? By butterfat production per acre or net returns per acre? Perhaps, but is there not more to it than that?

Those who have visited the farm of Mr J. S. Stronge on the Arawhata Road, near Opunake, will almost certainly agree that there is, for he has developed a farm and a home of which anyone could be proud, even though he has a long way to go before the production reaches its maximum. His achievements show a genuine love of the soil and indicate that his reward may not be measured in money but in the satisfaction of farming a forbidding soil and beautifying the countryside.



Part of Taranaki Province, showing Egmont County. The location of Mr Stronge's farm is indicated by an X.

Keep a tight rein on finances . . .



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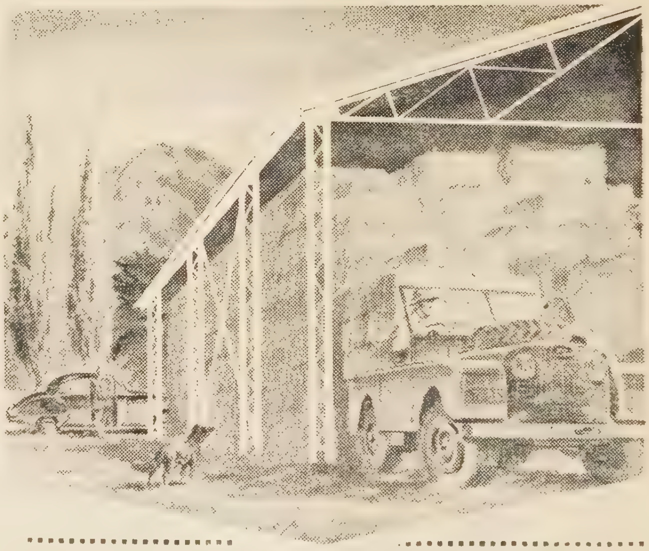

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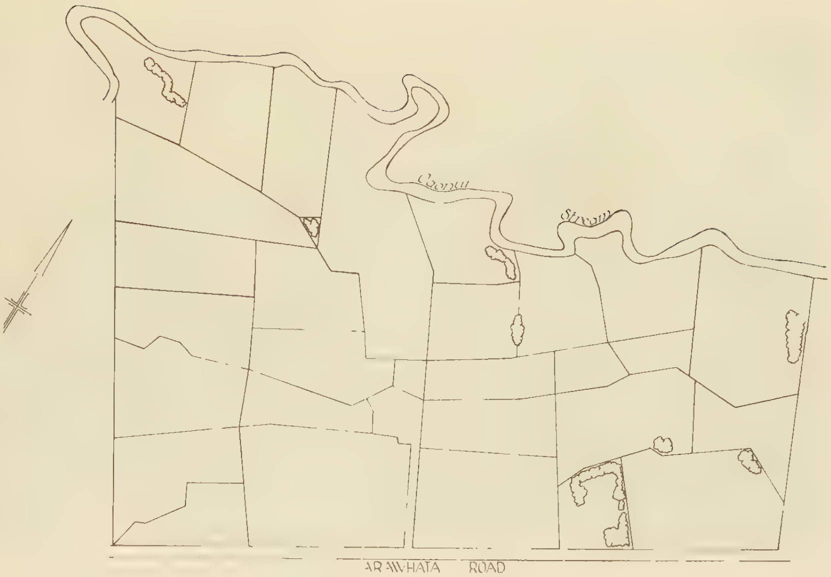
ONE of the outstanding features of the Oaonui district of the Egmont County is the lack of good shelter. In some parts the only trees are a few straggling *Pinus muricata* belts, barely existing against difficult soil conditions and strong winds.

You need only drive down the main road from New Plymouth to Opunake when there is a southerly or south-easterly wind blowing to agree that the country round Oaonui has little to commend it without good shelter. These are the conditions under which Mr Stronge has developed a farm and a home which are in many ways outstanding.



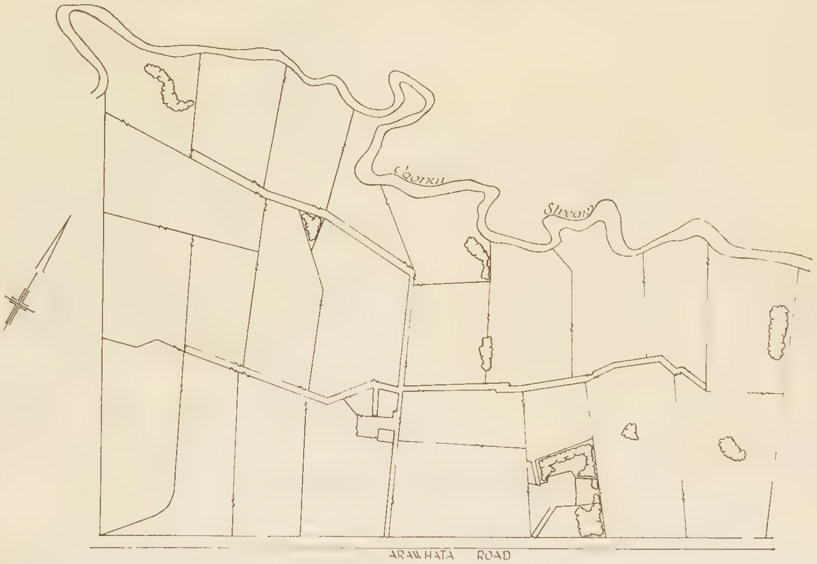
The original layout of the farm. →

Diversity of Interests

Mr Stronge is a keen farmer, but also perhaps from necessity, he has become a first-class forester and is a vice-president of the New Zealand Farm Forestry Association. As one of the prime movers in the forming of the Taranaki Farm Forestry Association in 1957 he was its first president. He is a keen member of the Opunake branch of the Returned Services Association, and is also a member of the Egmont County Council.

The Farm

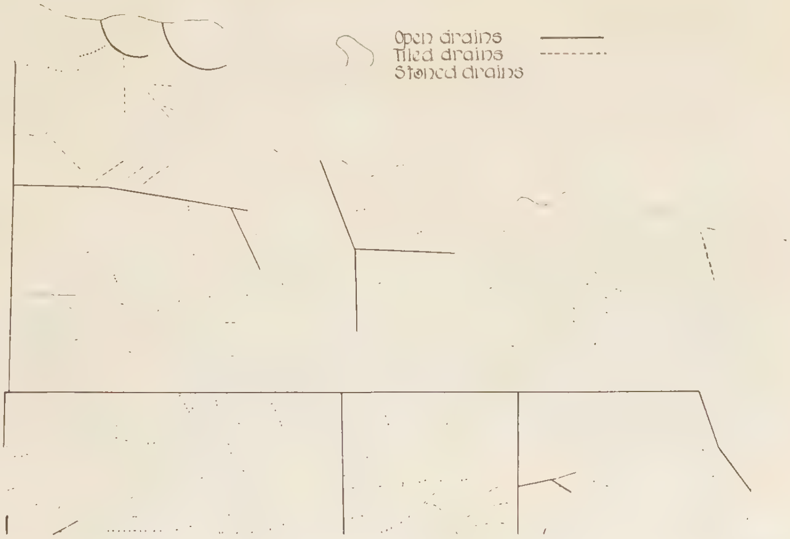
The property which is the subject of this study in farm management has been farmed by the Stronge family for many years, but, apart from two years in the mid 1930s, it was run by sharemilkers from 1931 to 1945, when Mr Stronge returned from war service and took over the farm. It is about two miles up the Arawhata Road on the western side of Mt. Egmont at an altitude of 240 ft.



New layout with all paddocks →
served from a metalled race.

The first eruption of the mountain many thousands of years ago covered the area with mud in which there were huge heaps of boulders and stones. Most of the mud was probably washed away by rain, leaving piles of boulders on the surface. These were covered with volcanic ash from a later eruption and the countryside is now strewn with small hillocks ranging in height from a few feet to about 40 ft.

In between the hills the land is often wet, sometimes even very swampy, largely because of the gritty pan 2 or 3 ft below the surface which has held



The diagram shows the 15 miles →
of drains which Mr Stronge has dug.
Most have been stoned or tiled.

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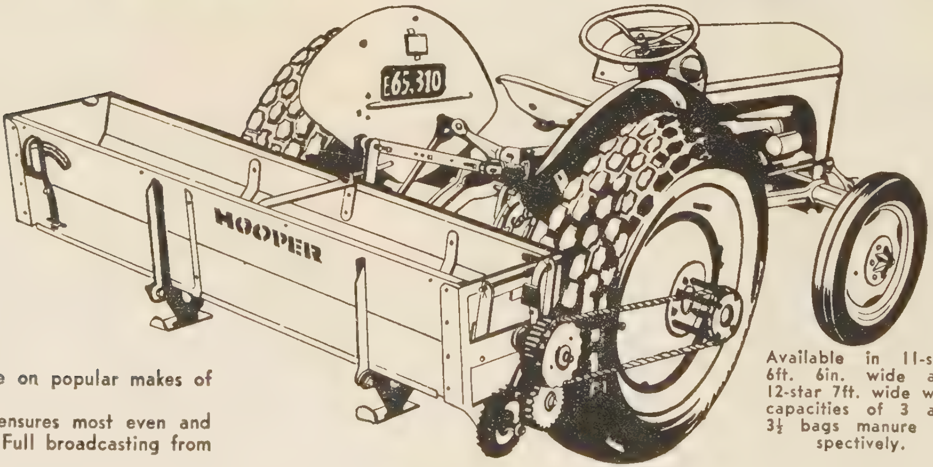

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up the free passage of water and has resulted in an iron pan forming in patches at a depth of 1 to 2 ft. Consequently there is a drainage problem which is unusual in the volcanic soils of Taranaki.

Drainage

Draining land such as this is very difficult. Most of the wet patches appear to start at the base of a hummock and successful drainage involves following up each wet area to its source with a drain which cuts through the impervious layers and frees the water held near the surface.

A systematic layout of drains which can be expected to draw water from a certain distance each side is not possible on this country and the final drainage pattern as shown in the lower diagram on page 179 gives an idea of the complexity of the job.

Until drainage machines were introduced after the last war the work was done by hand and one look at the land is sufficient to make one appreciate how difficult that would be.

Stone drains, which were once almost the only ones used, are still common in this district, but in nearly all the drains dug now the water is piped in 4 in. field tiles. Mr Stronge has considerable lengths of stone drains and has even installed some in recent years. Suitable stones for making these drains are, of course, readily available from the material dug out and costs are not great apart from those of digging and labour. Field tiles are, however, easier to handle and are preferred for that reason.

The most common machine used for digging deep drains has been a heavy back-acting ditcher, but good work is now being done by a hydraulically operated ditcher mounted on the back of a farm tractor.

Many of the drains dug a few years ago were deeper than necessary and because a very wide bucket was used an excessive quantity of material was removed. This added considerably to the cost of draining, but the wide drains were often necessary because of the large stones that had to be removed.

Mr Stronge now considers that shallow surface drains are sufficient to take away most of the water. The lower cost of their installation is an important consideration for the farmer taking over a farm which needs a lot of drainage, especially if his capital is short. The underground drainage can be done later when finance is available.

On his farm Mr Stronge estimates that there are nearly 15 miles of drains. The drains dug in the last five years have made a great difference to the stock carrying capacity of the farm. Before this the paddocks were so wet in winter and spring that only limited numbers of stock could be carried.

A volcanic hummock typical of many on Mr Stronge's farm that have been reduced or eliminated during his development of the property. The method is described in the text below.

Mr Stronge with his hand on one of the large boulders in a typical soil profile.

Low Natural Fertility

Undeveloped, this country has two other real disadvantages beside wetness, which has just been discussed; they are its low natural fertility and its hummocky, rough nature.

The way the hummocks have been reduced or sometimes completely removed by bulldozing is a feature of Mr Stronge's farm, though this has temporarily accentuated the fertility problem.

The hummocks are mostly stony under the thin layer of soil and the stones are valuable for farm roads or races. The top is stripped off, the stones and gravel removed and used

A comprehensive drainage system is essential in the early stage of development. The illustration shows the start of a new tile drainage system.

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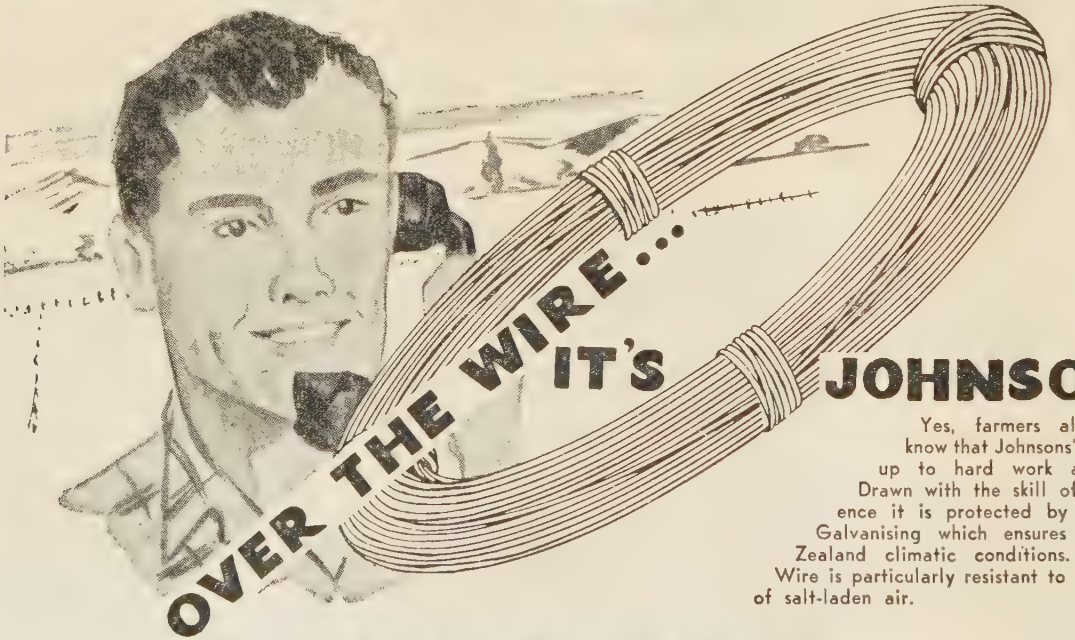

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for road building, and the big stones are replaced and covered over with as much gravel and soil as possible before the grass is sown.

Grass growth is never very vigorous after this treatment, as there is little real soil left. The problem is overcome by spreading plenty of cowyard manure on these bulldozed hilltops during the first year and once the fertility builds up it is surprising how well a pasture holds.

The flatter land is also of low fertility and heavy dressings of phosphate and potash are needed to build up the fertility.

About 3 cwt of 33⅓ per cent potassic superphosphate has been used with good results, with the addition of 2 lb per acre of DDT on some paddocks in the past few years to reduce grass grub damage, but even heavier rates of topdressing could be used.

A simple field trial about three years ago pointed clearly to the value of 2 cwt of potash per acre in quickly raising fertility to the level where short-rotation ryegrass held in a pasture, whereas it had rapidly disappeared with lighter dressings.

Experience on other farms on similar soils has highlighted the value of heavy dressings of phosphate and potash to get a quick build up of fertility to enable the maximum stock to be carried.

Farm Improvement

THIS farm has been one of six in the Department of Agriculture Farm Improvement Scheme in the Egmont County started in the 1953-54 season.

Mr Stronge has concentrated on developing a good layout, with all paddocks served by solid, metalled races, and this, with good drainage of the paddocks themselves, has made it possible to carry a beast to the acre over the winter.

Old cows are rearing up to four calves each. Artificial breeding is used to produce these dairy-beef calves.

Several seasons ago before the run-off was used the cows were wintered on silage and hay followed by grass in the late winter and the farm came through one of the wettest winters in the district in first-class order. This management has proved ideal in this area.

Apart from grass, silage, and hay, the only supplementary feed grown is a crop of white-fleshed turnips for autumn feed and sometimes green feed oats after the turnips are finished. Chou moellier is not used because of the danger of its roots blocking tile drains.

Production

Though it seems that the farm can now carry the 140 cows milked quite comfortably, the production reached in the past three seasons has been helped by the fact that the herd has been wintered on a run-off property. No doubt a run-off is of value where a property is wet and of low fertility, where stock cannot be wintered, and there is difficulty in growing enough winter feed; but where the farm has been drained and the paddocks have been ploughed and sown in first-class pastures and are topdressed regularly it is questionable whether a run-off is a sound proposition.

It does not look very impressive if 224 acres of this country can produce only 43,000 lb of butterfat, even when helped by a winter run-off.

A race gives easy access to all paddocks on the farm. *Pinus radiata* belts are grown for shelter and timber.

Mr Stronge will be the first to agree that the potential is far from being reached, but while 43,000 lb of butterfat off 224 acres is very moderate production by comparison with high producing farms, it is good when compared with similar farms in this locality and also compared with the 6,000 lb produced in the 1920-21 season, 12,800 lb in the 1935-36 season, and 13,800 lb in the 1945-46 season. From 1950 to 1959 the cow numbers have been increased from 88 to 140.

Judging by the way Mr Stronge has developed this farm to its present level, a potential of 180 cows with a per cow production of 350 lb of butterfat should be possible, giving a total production of 63,000 lb of butterfat. Young stock could still be carried.

Farm Statistics

Area: 224 acres

Production:

1920-21	6,400 lb of butterfat
1935-36	12,800 lb of butterfat
1945-46	13,800 lb of butterfat
1950-51	24,400 lb of butterfat
1958-59	43,000 lb of butterfat

This per cow production may sound high for the particular district, but over the last five years artificial breeding has been used and his Ayrshire and Ayrshire-Jersey cross herd under good management is quite capable of this production.

Special Features of Farm

The house is very well sheltered by tall *Pinus radiata* and eucalypt trees planted several chains from the house.

Inside this shelter is planted an attractive garden with a wide variety of shrubs including a very vigorous specimen of a semi-tropical shrub, the hibiscus.

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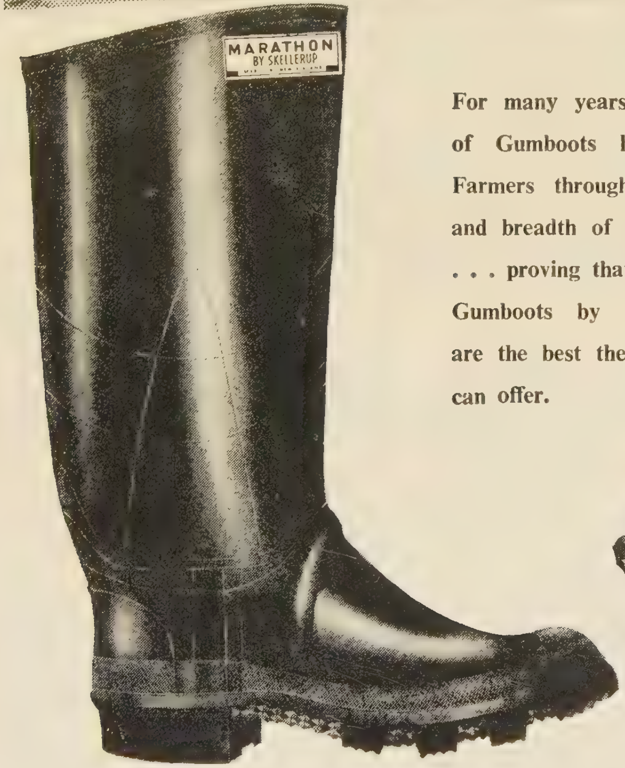

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Raising Cross-bred Beef

Cross-bred beef has been raised on this farm for the past two or three seasons by mating several cows by a.b. to Aberdeen Angus bulls and raising the cross-bred calves on some of the old cows in the herd which may have been difficult to milk and which consequently slowed up the shed routine. Some have raised up to four calves. Last season one old cow reared 1,200 lb of veal by March and then returned to the herd for two months, producing over 30 lb of butterfat in April.

Farm Forestry

In recent years the original road boundary shelter belt of *Pinus muricata* has been supplemented by small blocks of *P. radiata* and macrocarpa planted in corners of paddocks. These are making remarkable growth. They will be harvested when they are about 15 years old.

Pinus radiata is the species which Mr Stronge likes best. It grows quickly and produces much needed shelter early. The trees suit the country, which has a high water-table with a hard pan often not far below the surface and therefore they do not blow over like some of the other species. Radiata pine should be harvested at 15 years because older trees than this begin to thin near ground level and cause draughts.

Main points of the method of preservation Mr Stronge uses are:

Posts are cut from a felled tree and left uncovered for two or three months and then stacked and covered. Sample posts are check weighed after about two months and when they reach a stable weight over a period of four to six weeks they are considered dry enough to treat.

The treating process is:

1. The bark is stripped from the posts. Posts from the butt end of the tree may be split in two with a chain saw.
2. Posts are treated with creosote in a vat made from an old factory cheese vat fitted with a hinged roof. Sixty to 70 posts at a time are tied into bundles with fencing wire and lowered into the vat with the front-end loader of a tractor.

   Rate of absorption of the creosote appears to vary with temperature, being slower in cold weather.
3. March or April is thought to be about the best time for treatment. Posts can be easily dried out in late summer.
4. Forty-eight hours' immersion in creosote seems adequate. The vats are in two compartments and when a new batch is put in, bundles from the other vat that have had sufficient immersion are placed on top to weigh the new ones down.

Ends of the posts are trimmed on the slant before they are treated so that they will shed water when in the fenceline.

Ordinary staples hold quite well in these treated posts, but some people recommend the use of longer staples.

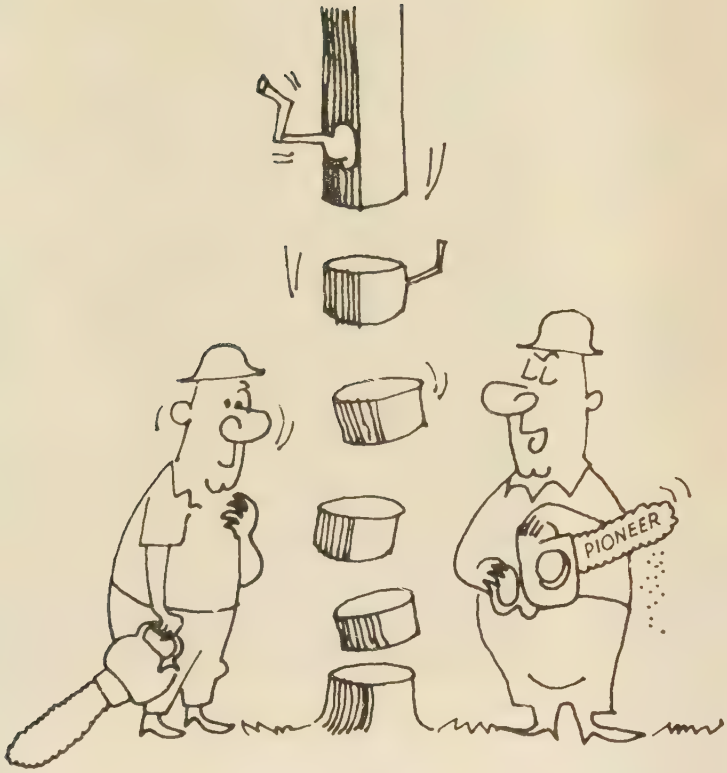
Creosote for post treatment is landed on the farm for 3s. per gallon. One gallon of creosote is allowed per post and with 1s. for labour posts cost 4s. each.

The quantity of creosote required varies with the timber and the only way to make sure that the creosote has penetrated the posts properly is to take samples and cut them through crosswise and lengthwise.

The life of such posts has been stated by farmers in various parts of New

The herd coming in for milking passes through a foot bath before entering the shed.

The main yard of the dairy shed has a solid concrete wall with built-in troughs angled at each corner. Two walls are sides to implement sheds.



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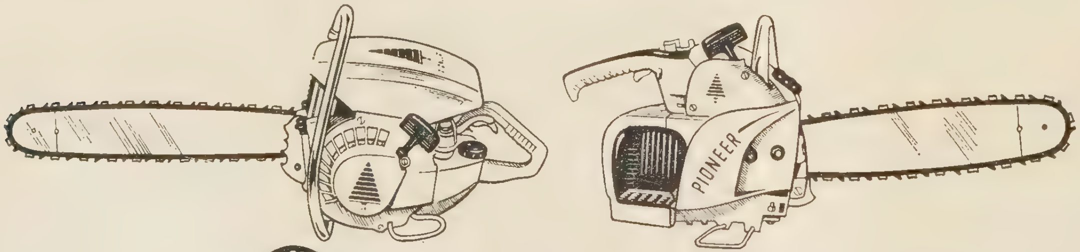

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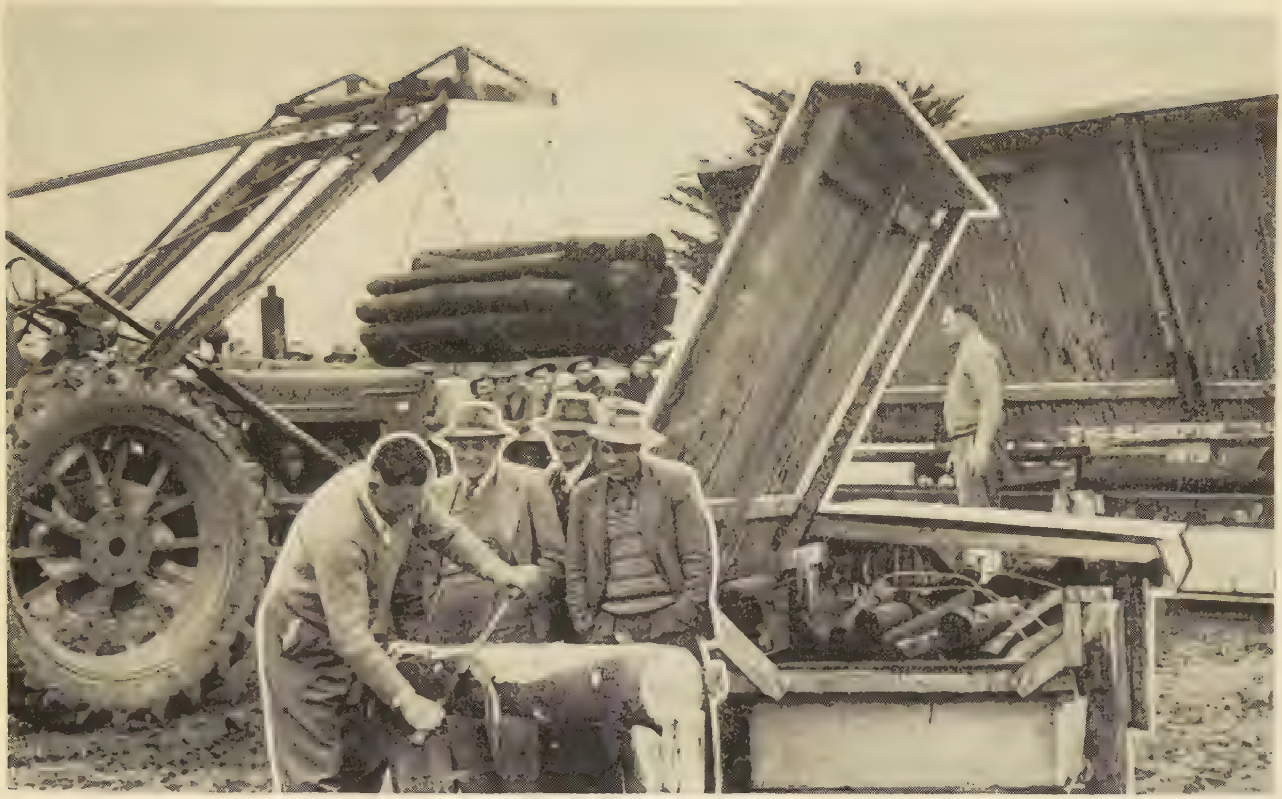

▲ At back, handling of a wire-tied bundle of posts by the tractor hoist, with the counter-balanced galvanised corrugated iron roof of the vats raised; inset, posts in the vats with a draining bundle weighing down a completely immersed bundle beneath; and removal of all bark with a long, two-handled curved knife in preparation of a post for immersion in the creosote.

Zealand to be 20 to 30 years and may be longer.

Mr Stronge has built a hay barn holding 1,600 bales of hay from home-grown timber. An estimate of the cost of this shed for materials and labour was £280.

All farm gates, posts, and battens are made from home-grown timber, so that here, in a district noted for its lack of shelter, is a farmer who has not only beautified his farm with trees but is using them profitably.

Perhaps it will be more satisfying still when the production reaches nearer 60,000 lb of butterfat than 43,000 lb, but even so this is a farm which would attract the eye of any visitor and which any farmer would be proud to have developed.

Mr Stronge discussing his new storage barn built from *Pinus radiata* grown on the property. The barn holds 1,600 bales of hay.

Recent Research Work

Poa annua in Established Lucerne

DALAPON is now widely used in New Zealand to control grass weeds in lucerne. Control of perennial grasses and annual grasses such as barley grass with dalapon is probably economically justified in healthy stands sprayed before any marked mortality of the lucerne has occurred through grass competition, but there is not such a clear case for its use in lucerne stands infested with *Poa annua*, as they often are in coastal Otago.

Two trials were carried out on the control of *Poa annua* at Invermay Research Station, one in the spring of 1957 and another in the spring of 1958. The first trial in a wet spring showed that *Poa annua*, while contributing to total yield, reduced yield of lucerne. Dalapon at 2 lb per acre gave good control of *Poa annua* with only slight effect on total yields; however, a marked increase in lucerne yield was recorded. The lucerne was not so tolerant to rates of dalapon above 3 lb and yield reductions occurred with 5 lb per acre, while TCA at 15 lb per acre also reduced both total yield and yield of lucerne.

A mechanically weeded treatment in which about 75 per cent of the *Poa* was removed in the early stages also reduced yields, which indicated that physical damage to the lucerne can be of greater consequence than a light rate of dalapon such as 2 lb per acre.

FIRST SEASON'S YIELDS

THE dry matter yields at the end of the season after three cuts were:

	Total yield	Yield of lucerne only
	lb	lb
Control	10,450	8,920
Dalapon 2 lb per acre	10,280	10,140
Dalapon 3 lb per acre	9,480	9,420
Dalapon 5 lb per acre	8,880	8,720
TCA 10 lb per acre	9,730	8,970
TCA 15 lb per acre	9,340	8,670
Control weeded	9,770	9,000

Dalapon at 3 and 5 lb and TCA at 15 lb differed significantly (5 per cent) from control in total yield.

All dalapon treatments gave good control of *Poa* throughout the first growing season, but by the beginning of the next season (one year after spraying) some recovery or reinfestation of *Poa* had taken place in all treatments. It was considered that all treatments except the high rates of dalapon, 3 and 5 lb, required respraying for *Poa annua* control.

A dry spring provided a major change in environment for the trial laid down in the following year; this caused a progressive deterioration in *Poa* competition and six weeks after treatment only minor differences in *Poa* control were evident. By the time the first cut was taken hardly any *Poa annua* was present in any treatment, and by the second cut complete control had been achieved by the dry conditions prevailing.

Yield data for the two cuts showed that all treatments reduced yields and all but dalapon at 2 lb per acre were significantly different from control. The 1958-59 total yields in two cuts, were: Dalapon 2 lb, 5,190 lb; dalapon 3 lb, 4,590 lb; dalapon 4 lb, 4,600 lb; TCA 20 lb, 4,570 lb; control hand weeded, 4,760 lb; control, 5,520 lb.

There was little or no *Poa annua* present in the herbage harvested during this season, the adverse conditions causing very prostrate growth and making it completely unproductive for hay.

CONCLUSIONS

In these two trials chemical methods of control were more satisfactory than mechanical control, while dalapon was a better chemical than TCA. Though lucerne tolerates best a rate not exceeding 2 lb of dalapon, it is probably better to apply 3 lb per acre, because this rate is sufficient to minimise the degree of reinfestation in the second season. Under some conditions of environment there may be little or no reinfestation of *Poa annua* where a good kill is obtained initially.

The effect of competition from *Poa annua* on the yield of lucerne is shown in the yields for the 1957-58 season, where it is estimated that the optimum treatment, 2 lb of dalapon (controlling the *Poa annua* with only slight check to the lucerne), resulted in approximately 14 per cent increase in lucerne yields.

The economics of this aspect can easily be worked out if the value of 1,200 lb of dry matter of lucerne (the increase in yield over the season) is balanced against the cost of chemical plus application, say 32s. an acre. However, the total yields of lucerne plus *Poa annua* on control plots were comparable with those of lucerne only on plots treated with dalapon at 2 lb. In a dry spring the competition from *Poa annua* is greatly reduced and no increase in lucerne yields may follow spraying (see yields for 1958-59 season).

However, as it is probable that further deterioration is likely to take place if a lucerne stand is permanently suffering from a dense infestation of *Poa annua*, control is essential, though care should be taken to keep costs down and not more than 2 to 3 lb of dalapon should be applied.

—*W. F. A. MEEKLAH,*

Technician, Department of Agriculture Invermay Research Station

Improving the Fertility of Two-tooth Romney Ewes

Shearing two-tooth ewes just before mating improves their fertility.

THE claim that in the Waikato district shearing two-tooth Romney ewes just before mating improves their fertility at first service and probably reduces the number of dry ewes has been confirmed by experiments conducted by officers of Ruakura Animal Research Station. Considerable effort has been made by several of these workers to improve the lambing rates of Romney flocks, and at the 1960 Ruakura Farmers' Conference T. J. McCLURE, formerly Veterinary Research Officer, Ruakura, described experiments connected with improving the fertility of two-tooth Romney ewes. This article is an adaptation of the paper he presented.

THE lambing rate, as measured by the number of lambs alive at marking and expressed as a percentage of the ewes which were put to the ram, is affected by:

- The number of ewes which die before lambing.
- The number of lambs which are aborted, are born dead, or die before marking.
- The number of multiple births.
- The number of ewes which fail to lamb.

Death of ewes before lambing is largely outside the scope of the work of Ruakura, but most deaths are caused by sleepy sickness (pregnancy toxaemia), milk fever, blood poisoning (either blackleg or malignant oedema), and prolapse of the uterus or vagina.

Abortion and neo-natal mortality in lambs are also largely outside the scope of research at the Station, but the Ruakura Diagnostic Section's records show that in the northern part of the North Island the main cause of abortion is vibriosis and the main causes of neo-natal mortality in lambs are difficult birth (dystokia), navel infection, and failure to feed.

Multiple Births

Both L. R. Wallace and E. A. Clarke have studied the incidence of multiple births. By selective breeding, Wallace has raised the number of lambs born (lambing rate expressed as a percentage of the ewes lambing) by about 20 per cent over control ewes, though there was a somewhat higher death rate in the lambs of the high fertility flock. He has also shown that flushing ewes just before and during the tupping season increases the number of multiple births and that well grown, good conditioned ewes have more lambs than poorer ewes. Clarke has shown that many more half-bred Romney x Border Leicester ewes have twins than Romney ewes.

Failure of ewes to lamb is a complex problem; it may be due to a ewe's not being mated or being mated by a sterile ram, to the ewe not coming on heat or ovulating, or its egg not being fertilised or not developing normally after fertilisation. The problem is quite important, for often as many as 20 per cent of ewes in a flock do not lamb. As two-tooth ewes particularly are affected, and as up to 40 per cent sometimes fail to lamb, infertility in two-tooths has attracted considerable attention.

Various workers at Ruakura, particularly I. J. Inkster and L. J. Lambourne, have studied the mating behaviour of ewes and rams. Their main conclusions are that management is particularly important in the mating of two-tooth ewes. They should be mated in small paddocks and mobbed once or twice daily.

Poorly grown ewes are more likely to be dry than well grown ewes. Inkster has shown that within flocks,

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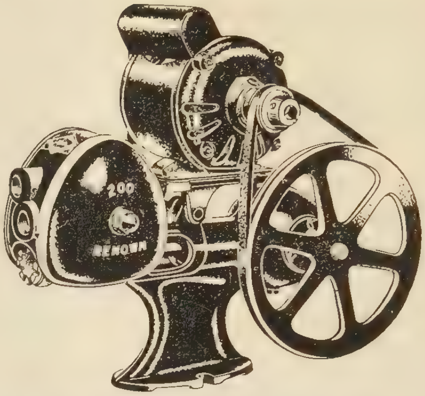

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fewer woolly-faced two-tooth ewes lamb than do open-faced ewes.

Satisfactory equipment and techniques are now available for making reasonably accurate estimates of rams' fertility before the mating season. D. G. Edgar has made some valuable contributions to this aspect of sheep infertility.

Remaining Problem

The problem which still remains after well grown two-tooth ewes in good condition are mated to fertile rams with good mating management has been the subject of the series of investigations which I shall now describe.

In 1947 and 1948, C. Wallace studied the reproductive performance of ewes and showed that dry ewes were of two types:

1. Those which continued to show recurrent oestrous cycles throughout the tupping season but did not hold to service after mating.
2. Those which ceased to show cycles during the tupping season but later were found to be not pregnant.

Most of the ewes carried over until the next year were of normal fertility. The infertility did not appear to be caused by failure of the ewes to ovulate.

To investigate further the dry ewe problem, flocks of two-tooth Romney ewes were purchased each year and run on the Ruakura Out-station in experiments designed to find the stage or stages of reproduction where infertility occurred. In the first year (1958) the ewes were not subjected to any treatment and ram fertility, mating management, and body condition were all satisfactory.

Ruakura Out-station 1958 Experiment

(D. G. Edgar and I. J. Inkster)

Three hundred October-shorn two-tooth Romney ewes were run with fertile raddled rams from the first week in March. One third of the flock was killed two to three days after tupping and the eggs recovered and examined for evidence of fertilisation. Another third was examined 20 to 110 days after tupping to find the death rate of the embryos. The remaining third was left until lambing and acted as controls. The result of this experiment suggested that the greatest single cause of low fertility was the failure of the eggs to develop.

As the result of a field trial conducted in the same season (1958) at Waikeria to test the claim that shearing two-tooth ewes before mating improved their fertility, the Ruakura Out-station experiment was modified in 1959 to incorporate this treatment.

★ ★ ★

Waikeria 1958 and 1959 Field Trials

(I. J. Inkster)

In 1958 about half of a mob of 1,100 two-tooth ewes on the Waikeria Prison Farm was shorn immediately before the rams were turned out (28 February) and shorn and unshorn sheep were run together. Seventeen per cent more ewes lambed in the shorn than in the unshorn groups. In 1959 the trial was repeated with a line of 1,250 ewes. The results are shown in Table 1.

TABLE 1—LAMBING PERFORMANCE OF TWO-TOOTH EWES, WAIKERIA 1958 AND 1959

Ewes	Shorn 1958	Shorn 1959	Unshorn 1958	Unshorn 1959
	%	%	%	%
Rearing lambs* ..	82	86	60	70
Losing lambs ..	12	6	17	6
Lambing ..	94	92	77	76
Failing to lamb ..	6	8	23	24

* Alive at docking

The effect on the distribution of lambing was quite marked; the unshorn ewes lambed later than the shorn ewes (Table 2).

TABLE 2—DISTRIBUTION OF LAMBING, WAIKERIA 1959

Ewes	Shorn	Unshorn
	%	%
Lambing 27 July-24 Aug. ..	74	45
Lambing 25 Aug.-15 Sept. ..	10	16
Lambing 16 Sept.-19 Oct. ..	2	9

Only ewes with lambs alive at docking were considered.

The mean lambing date of the unshorn ewes was seven days later than that of the shorn ewes.

★ ★ ★

Ruakura Out-station 1959 Experiment

(I. J. Inkster)

Early in March 1959 an even line of 280 October-shorn two-tooth ewes were randomised in two groups on the basis of liveweight and condition. One group was then shorn and one group left woolly and both were run with fertile raddled rams. As the ewes were marked within each group they were allotted alternately to a slaughter group and a control group which was carried through to lambing.

At slaughter, one to three days after mating, the eggs were recovered wherever possible and examined for evidence of fertilisation. These results, when compared with the fertility data from the control ewes, showed that while the apparent states of the eggs were similar, there was a big difference in the lambing rates. This suggests that pregnancy was terminated in a number of the control unshorn ewes. This is shown in Table 3.

TABLE 3—FERTILITY DATA OF SLAUGHTERED AND CONTROL EWES, RUAKURA OUT-STATION 1959

	Shorn	Unshorn
	%	%
Slaughtered ewes:		
With cleaved eggs	68	62
With uncleaved eggs ..	12	13
With fractured eggs	16	16
With no eggs recovered ..	4	9
Control ewes:		
Holding to 1st service ..	89	64
Holding to 1st or 2nd service	94	81
Holding to subsequent service	0	11
Not holding to any service ..	6	8

The lambing data for these groups, expressed as a percentage of ewes put to ram, is shown in Table 4.

TABLE 4—LAMBING DATA, RUAKURA OUT-STATION 1959

	Shorn	Unshorn
	%	%
Ewes lambing	93	90
Lambs born	100	96
Lambs alive at 3 days ..	84	74
Lambing (lambs alive 28 days)	84	72

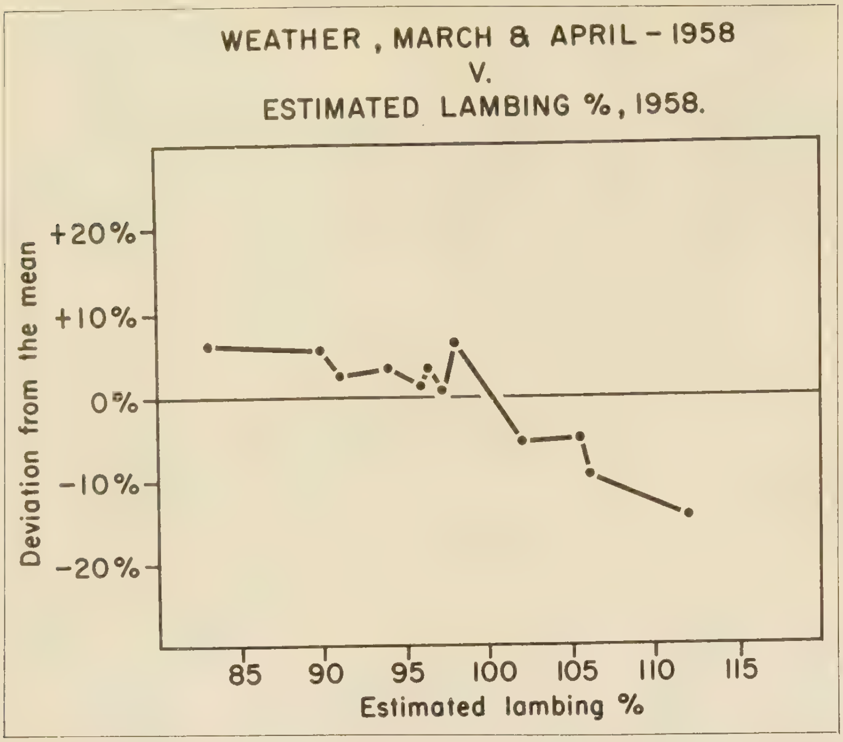
The difference in lambing percentage was due mainly to lower lamb mortality in the shorn group. This group, in addition, produced nearly 1½ lb more wool per ewe during the period October 1958-December 1959, though there were no significant differences in their liveweight.

Observations with tethered rams at Whatawhata showed that the mating behaviour of two-tooth ewes was not affected by shearing just before mating.

★ ★ ★

Ruakura Out-station 1960 Experiment

In 1960 the experiment was slightly modified to test another theory as to the possible cause of low fertility in two-tooth ewes and to study further the effect of shearing before tupping. As far as I know there are only three types of environmental stress which depress the fertility of female animals: Heat, nutritional, and nervous stresses. The most likely reason for the increase in the fertility of sheep after shearing is that a heat stress has been reduced or eliminated. Though at first glance, and especially to anyone accustomed to Australian conditions, it would seem unlikely that sheep in New Zealand



could possibly suffer from heat stress, three factors are relevant:

1. Sheep are mated in the warm part of the year, and in the Ruakura

experiment in 1959, though there was a large difference in first service fertility, the unshorn sheep were ultimately almost as fertile as the shorn ewes.

2. The critical temperature and humidity for Romney ewes is likely to be lower than that for Australian Merinos.
3. There is a possibility that the increasing lambing rate that occurs from north to south in New Zealand is related to climate and not to latitude. The data for 1958 is shown in the graph at left.

At the end of February 1960, 300 October-shorn two-tooth Romney ewes were randomised in two groups on the basis of liveweight and condition. One group was then shorn and the other left woolly. All were run with fertile raddled rams. Body temperatures were taken soon after the ewes were marked. The preliminary results (non-return rates) for first service and mean rectal temperatures are shown in Table 5.

TABLE 5—PRELIMINARY FERTILITY AND RECTAL TEMPERATURE DATA, RUAKURA OUT-STATION 1960

	Shorn	Unshorn
Per cent holding to 1st service	83	61
Mean rectal temperature ..	103.2 degrees F	103.9 degrees F

The fertility of the ewes in each group conforms to the trends shown in the earlier experiment and field trials. The mean temperature of the shorn ewes was 0.7 degrees F lower than that of the unshorn ewes. Rectal temperatures of sheep vary greatly, but because of the well known effect of heat stress on fertility, this investigation will be continued.

Agricultural and Pastoral Show Dates

THE following are dates and venues of A. and P. shows up to the end of April:

NORTH ISLAND

February

22 February—Te Kauwhata A. and P. at Te Kauwhata.
24 and 25 February—Wellington and Hutt Valley A. and P. at Trentham.
24 and 25 February—Te Kuiti and District A. and P. at Te Kuiti.
25 February—Waiapu A. and P. at Ruatoria.
25 February—Mangonui County A. and P. at Kaitaia.
*25 February—Whakatane A. and P. at Whakatane.
25 February—Waimarino A. and P. (Golden Jubilee) at Raetihi.
25 February—Putaruru District A. and P. at Putaruru.

March

*1 March—Morrinsville A. and P. at Morrinsville.
4 March—Opotiki A. and P. at Opotiki.
4 March—Albany A. and P. at Albany.
11 March—Kumeu District A. and H. at Kumeu.
18 March—Wellsford A. and P. at Wellsford.

SOUTH ISLAND

February

25 February—Kaikoura A. and P. at Kaikoura.
25 February—Buller A. and P. at Westport.
25 February—Central Otago A. and P. at Omakau.

March

4 March—Temuka and Geraldine A. and P. at Winchester.
*4 March—Rai Valley A. and P. at Rai Valley.
4 March—Amuri A. and P. at Rotherham.
11 March—Mayfield A. and P. at Mayfield.
11 March—Cheviot A. and P. at Cheviot.
*11 March—Mt. Benger A. and P. at Roxburgh.
14 March—Lake County A. and P. at Arrowtown.
18 March—Hawarden A. and P. at Hawarden.
*18 March—Upper Clutha A. and P. at Wanaka.
*25 March—Methven A. and P. at Methven.

April

3 April—Strath-Taieri A. and P. at Middlemarch.
3 April—Mackenzie Highland Show at Fairlie.
8 April—Oxford A. and P. at Oxford.
*15 April—Malvern A. and P. at Sheffield.

* The Department of Agriculture exhibit will be staged at this show.

Ram and Ewe Fairs

The following are dates and venues of ram and ewe fairs up to the end of March:

25 February—Southland Southdown Flock at Invercargill.
8 March—Southland Romney and Breeds other than Southdown at Invercargill.
10 March—Timaru at Timaru (wool breeds).
22 March—Southland All Breeds at Invercargill.

Wool Sales

The dates and venues of wool sales up to the end of June are:

22 and 24 February: Invercargill.
1 and 3 March: Dunedin.
8 March: Timaru.
15 March: Wanganui.
20 and 22 March: Auckland.
27 and 29 March: Napier.
12 and 14 April: Wellington.
19 and 21 April: Christchurch.
26 and 28 April: Invercargill.
3 May: Dunedin.
20 May: Wanganui.
24 and 26 May: Napier.
31 May and 2 June: Auckland.
7 June: Wellington.

Left—*Prunus serrulata* 'Shirotae' (Mt. Fuji), one of the earlier flowering cherries. This variety with semi-double pendulous white flowers makes an attractive specimen.

Above and below—*Prunus nipponicum*, a species of dainty habit, producing very pale pink flowers over a long period and holding well its leaves of wonderful autumn colourings. This species should be more widely planted as a specimen.

Prunus for Pleasure in the Flower Garden

By ROSALIE A. CAMPION,
Horticultural Instructor, Department of Agriculture,
Wellington

THE genus *Prunus*, belonging to the very large *Rosaceae* family, is collecting one of the largest, most important, and interesting groups of deciduous and evergreen trees and shrubs. *Prunus* is Latin for plum, which is probably why many people think of *Prunus* only as flowering plums. Within this group are the almonds, plums, apricots, peaches, cherries, and cherry laurels, most of which grow in the nothern temperate countries of Asia. Most of these species are deciduous, and in autumn several groups have glorious leaf colourings; especially noted are *Prunus nipponicum*, *P. sargentii*, *P. serrulata*, and *P. cerasifera*.

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PRUNUS flowers are normally perfect, bearing 20 or more stamens (pollen-bearing male parts) on the inside of the calyx cup, and one pistil (female part), the base of which will develop into a pulpy fruit containing a kernel. Many of the flowers are self-sterile and require cross-pollination before fruit will set, and in double flowers some or all of the stamens are converted into extra petals. This is why double flowers do not normally set fruit. While double flowers normally attract most attention, there is a certain elegance about single flowers.

Size

The *Prunus* family is so diverse that wherever a deciduous tree can be planted in a garden there is a *Prunus* that would suit the situation. Of the larger species *P. yedoensis*, *P. avium*, *P. sargentii*, and *P. conradinae* will each eventually be at least 30 ft high.

A large number of species and varieties come into the 15 to 30 ft group; for example, the Japanese cherries, almonds, peach, plums, and the Portugal and common (cherry) laurel.

Of the dwarf species, *P. incisa* and *P. glandulosa* are the most commonly grown. The last species is often not recognised as belonging to the *Prunus* family and is commonly known as the double pink may (*P. glandulosa roseo-plena*) and double white may (*P. glandulosa albo-plena*).

When ample space is available in farm homestead plantings, parks, or large private plantings the larger species should be considered, for they will become shapely specimen trees with a long period of interest if given room to develop.

Form

In larger gardens the bigger species are usually relied on for a display. In smaller, more intimate areas the form of branches, leaves, and flowers becomes more important. In these respects some of the less grown species have a subtle appeal. Wider planting of these would make our gardens more satisfying than the regular use of one or two well known cherry varieties, showy though they be. *P. cerasifera* var. *pissardii* with a combination of purple foliage, thin twiggy branches, and single white flowers brings its simple freshness to spring. *P. wrightii*, *P. conradinae*, *P. subhirtella*, *P. nipponicum*, and *P. campanulata* have single flowers, branches of good texture and shape, and flower and leaf colourings which give them interest throughout the year.

The cherry group has a wide range of tree forms: the upright Kanzan, the more globular Shirotae, and the horizontal Shimidsu Sakura, while *P. avium pendula* and *P. subhirtella pendula* provide weeping forms of great beauty.

Calendar of Flowering

There is much overlapping of the flowering periods of the many species and varieties of *Prunus*, and from autumn through to November it is generally possible to find some flowers in bloom. The beauty of the plants is not confined to this period, however, as the rich foliage effects of some flowering plums and the glorious autumn toning of many cherry varieties and species give added interest.

The list given is a guide to the flowering sequence of *Prunus*.

Flowering in July

P. subhirtella autumnalis
P. conradinae (until August)
P. mume rosea plena (for town months)

Flowering in August

P. pollardii (peach x almond)
P. communis (almond)
P. cerasifera pissardii (plums)
P. cerasifera pissardii nigra (for two months)
P. mume (apricot)
P. campanulata
P. wrightii
P. persica (Carsons varieties)
P. serrulata 'Shirotae' (until end of September)
P. subhirtella pendula
P. cerasifera moseri
P. cerasifera blireiana
P. serrulata 'Hisakura'
P. avium (into September)
P. yedoensis (into September)
P. incisa (into September)
P. sargentii (into September)

Flowering in September

P. subhirtella (in full bloom)
P. laurocerasus (in bloom)
P. persica (peach)
P. persica sanguineo plena
P. serrulata 'Yedozakura'
P. serrulata 'Ichyo'
P. serrulata 'Kanzan' (begins)
P. yedoensis
P. serrulata 'Shirotae' (at best)
P. nipponicum (at best)
P. padus (begins)

Flowering in October

P. glandulosa albo-plena
P. serrulata 'Kanzan' (in full bloom)
P. serrulata 'Amanogawa'
P. serrulata 'Shimidsu Sakura' ('Ashai Botan') into November
P. serrulata 'Shiro Fugen' (into November)

The evergreen laurels are quite distinct, having beautiful glossy leaves and a more stolid habit of growth.

Poisonous Properties

The material which gives to this family its typical scent is mainly the poison hydrocyanic acid (prussic acid). This substance is usually concentrated in the stone of the fruits, but is present in considerable quantities in the leaves of the common laurel *P. laurocerasus*. Clippings from this species should not be thrown over fences where stock could eat them in quantity.

Landscape Uses

Single specimens of the larger species should be used as basic planting in parks and in large gardens such as are often planned round farm homesteads. They do not normally look best as isolated specimens, however, and should be planned in groupings, some of which should be evergreen to throw up the flower colours.

Prunus Noted for Foliage

P. cerasifera blireiana (purple foliage)
P. cerasifera moseri (purple foliage)
P. cerasifera pissardii (purple foliage)
P. cerasifera pissardii nigra (deep purple foliage)
P. cerasifera 'Thundercloud' (deep smoky purple)
P. persica 'Hiawatha' (leaves coppery-purple)
P. laurocerasus (leaves glossy and evergreen)
P. glandulosa roseo plena (leaves reddish orange)
P. sargentii (young leaves bronze)
P. avium (autumn colourings)
P. nipponicum (autumn colourings)
P. serrulata 'Shirotae' (young foliage bronze)
P. serrulata 'Kiku Shidare Sakura' ('Cheals Weeping') glistening leaves
P. serrulata 'Fugenzo' (coppery foliage)
P. serrulata 'Hokusai' (leaves brownish bronze)
P. serrulata 'Ukon' (leaves turn purplish red)
P. serrulata 'Tai-haku' (young foliage coppery-red)
P. serrulata 'Kanzan' (reddish-orange in autumn)

The coppery colouring of *P. cerasifera pissardii* or copper beech greatly enhances the beauty of the wild white cherries, while the blue-greens of conifers or grey stone walls make good foils for the more harsh colourings of *P. persica* 'Clara Meyer' or *P. serrulata* 'Kanzan'.

The beauty of the flowering almond and some of the spreading cherries is best seen where it is possible to walk on lawns underneath and silhouette the flowering branches against the contrasting blue sky.

Care should be taken in the use of extreme shapes such as weeping or horizontal forms, which should be used only when special emphasis is needed. It is tragic to select the wrong cherry varieties and plant the spreading Shimidsu Sakura when there is room only for an upright form such as Amanogawa, and the necessity for an upright emphasis in that position.

In small town gardens where there is room for only one or two small trees *P. nipponicum*, *P. subhirtella*, or *P. sargentii* could be grown.

In a secluded garden the association of a garden pool and weeping cherries is most effective.

Where there is a garden seat the shade given by *P. nipponicum*, or *P. serrulata* 'Shirotae' (Mt. Fuji) will enhance the position.

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In a border flowering peach, plum, and apricot can add variety to a more staid planting of evergreens, while the varieties of *P. glandulosa* can be brought to the foreground.

Upright cherries such as Kanzan can be used effectively to "tie in" the formality of two-storied houses with the landscape. Formal driveways can be emphasised by the use of this variety and other upright varieties.

In several places in New Zealand avenues of spreading cherries create widespread interest and in a small way simulate the Japanese cult of Hanami (flower viewing).

As these plants are so adaptable to New Zealand conditions, a wider use could be made of them in roadside plantings. Flowering plums and cherries are particularly suitable for street planting, as they do not interfere with drainage, do not normally grow to a height which interferes with power or telephone lines, and are shapely specimens without the regular cost of pruning.

The common purple-leaved *P. cerasifera pissardii*, often referred to as the cherry-plum, could be more widely used as a hedge. The Japanese group a species such as this to make a massed effect; in a small sloping gully, for example. A hedge of this could be used as a screen between neighbours; it has the advantage of attractive foliage, flowers, and edible fruits. It should be pruned for the first few years to thicken the basal growth. Other species which can be effectively planted as hedges are the evergreen types which clip well and last well for many years if cut yearly in late summer.

Conditions for Growth

The *Prunus* family are widely adapted to the New Zealand climate. In most areas late frosts do not normally damage the wood of the tree, though sometimes the flowers, especially of almonds and peaches, may be damaged. In some areas wind may greatly reduce the growth of prunus, and they are unsuitable where strong coastal winds predominate.

The rootstocks on which plants are budded by a nurseryman are generally either seedling peaches (*P. persica*) or Myrobalan cherry-plum (*P. cerasifera*). Plants grown on cherry-plum roots may be grown in wetter positions than those on peach roots. The plants should never be waterlogged, however. Some species can be grown from cuttings taken during the late autumn. Where seedlings occur they should be budded or grafted with wood from a known variety which is worthy of a place in the garden. This should be done when the stem is the thickness of a pencil.

Soil Requirements

All *Prunus* species thrive best on good loamy soil which is only slightly acid. On most New Zealand soils the plants will develop into better specimens if given dressings of a balanced fertiliser during the first few years of growth. Established trees that lack vigour may benefit from applications of fertiliser. The shallow and fibrous roots respond well to mulching with organic material such as compost or animal manure.

[*Elliott*

Prunus wrightii. **This hybrid between *P. cerasifera pissardii* and *P. persica* has large pink flowers of good colour and purple foliage. It was raised in Auckland, and should become very popular when more widely known.**

Planting

Plants should be ordered from a reputable nurseryman early in the season so that good specimens can be obtained. Late autumn planting is preferable, but spring planting can be satisfactory if special care is taken that the roots do not dry out.

Plants normally come from the nursery having had some root pruning when lifted from the beds but with the shoots unpruned. When a hole larger than the roots has been dug, the damaged roots should be recut with sharp secateurs before planting.

The roots should be spread out in the hole and a mixture of compost and soil worked among them, firming as the planting proceeds. Roots should not be buried too deeply. The junction of roots and stem should be no more than 6 in. below the soil surface and the roots should go down in a pyramid. The strongest roots should be put to the windward side.

Especially in windy areas, plants should be staked when they are set out. Rubber, sacking, or nylon stockings make satisfactory ties which should be replaced when necessary.

After planting, most trees should be pruned to train them in the shape required. In both weeping and upright trees the new growths should be reduced by about half. Any growths not required for framework should be removed entirely. During the growing season young trees should be inspected regularly; young growths developing where not required should be nipped out immediately. Wounds will then heal over quickly, and large pruning cuts will be avoided later. Apart from this initial training and shaping, little pruning should be necessary. When necessary, the best time for pruning is just before the new growth begins, which is usually after flowering. The flowering branches can be picked generously but judiciously.

Treatment of Wounds

Whenever plants of this family require the removal of limbs, every precaution should be taken to cover the wound immediately. Petroleum jelly makes the most satisfactory seal for the wound. While sealed with petroleum jelly, the damaged cells heal to form a protective callus underneath the seal. If petroleum jelly is not available, however, it is better to seal with bituminous paint or tar than leave the wound exposed to the entry of the silver leaf fungus.

Pest Control

The main insects attacking *Prunus* are the cherry (or pear) leaf slug, leafroller caterpillars, and aphids. Plants should be examined throughout the growing season and sprays can be applied whenever insects appear.

Cherry slug: This black, slimy pest eats the tissue of the leaves, leaving a bare skeleton. Sprays of arsenate of lead, malathion, lindane, or DDT could be used.

Leafroller caterpillar: These pests stick leaves together, sheltering between them while they eat the leaves. An early spray of arsenate of lead or lindane will protect the foliage. Once the caterpillars are established and protected by the leaves, sprays are not very effective and caterpillars should be picked off by hand.

Aphids: Several types will attack *Prunus*, causing distortion by sucking the sap from the leaves and young shoots. Sprays of malathion or lindane should be applied.

Prevent Diseases

Several fungous and bacterial diseases damage *Prunus*. Preventive measures are:

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- Do not prune trees unnecessarily.
- Cover all wounds as mentioned earlier.
- Spray trees during the dormant season or preferably just before bud movement in early August with home-made bordeaux mixture. Four gallons of bordeaux mixture can be made by dissolving 6¼ oz (22 level standard tablespoons) of copper sulphate (bluestone) in 2 gallons of water in a plastic container. Mix 5½ oz (21 level standard tablespoons) of hydrated lime to a thin paste and slowly add to the copper solution while stirring. Finally add water to make 4 gallons of spray.
- As a preventive measure a spray of 4 oz (8 level standard tablespoons) of copper oxychloride in 4 gallons of water could be used instead of bordeaux mixture.

Silver leaf (silver blight): Caused by a fungous disease (*Stereum purpureum*), it is quite widespread in New Zealand on all species of stone fruits.

As a rule only one branch or perhaps a lateral is affected at first; the leaves instead of being a healthy green become greyish or silvery and may tend to curl at the edges. Often they fall prematurely. The infected branch may die within a few weeks or may remain alive for several seasons, producing silvered leaves each year. Only weak growth is made and, particularly when the trouble spreads to adjoining limbs, the tree often appears starved and unthrifty. Very rarely does a tree recover naturally.

After the fungus has killed a branch, it grows out through the bark to form small shelf-like projections, usually an inch or so across, sometimes white, but usually with a pink or purplish tinge. Within this fructification (fruiting body of the fungus) are produced the spores, which are dispersed mainly by wind. These spores will infect other trees only through dead cells such as are present in dead stubs or breaks in the bark such as pruning cuts, broken twigs or branches, and parts injured by insects and implements.

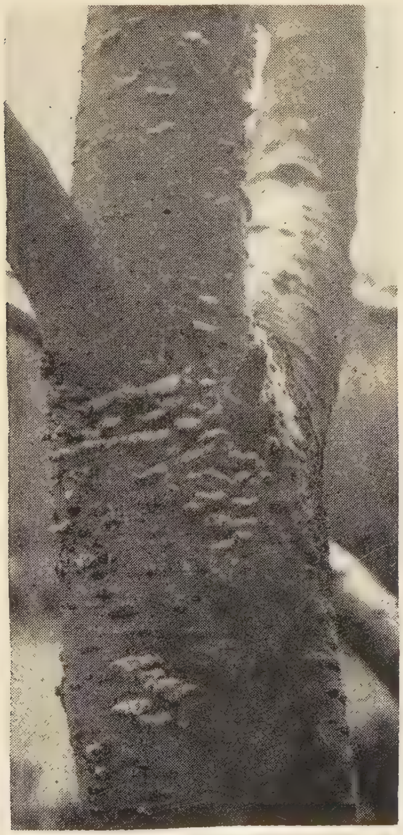
If only one branch is infected, its removal may prevent the disease spreading to others and so save most of the tree. It should be removed well below the lowest visible point of infection during summer; not only is infection most visible then, but healing is quicker. Cover the wounds with petroleum jelly.

"Blast" of stone fruits is a bacterial disease caused by the bacterium *Pseudomonas syringae*, which is widespread on all species of stone fruit throughout New Zealand, especially on trees under 6 years old. It has been known as "sour-sap", "die-back", and "gummosis".

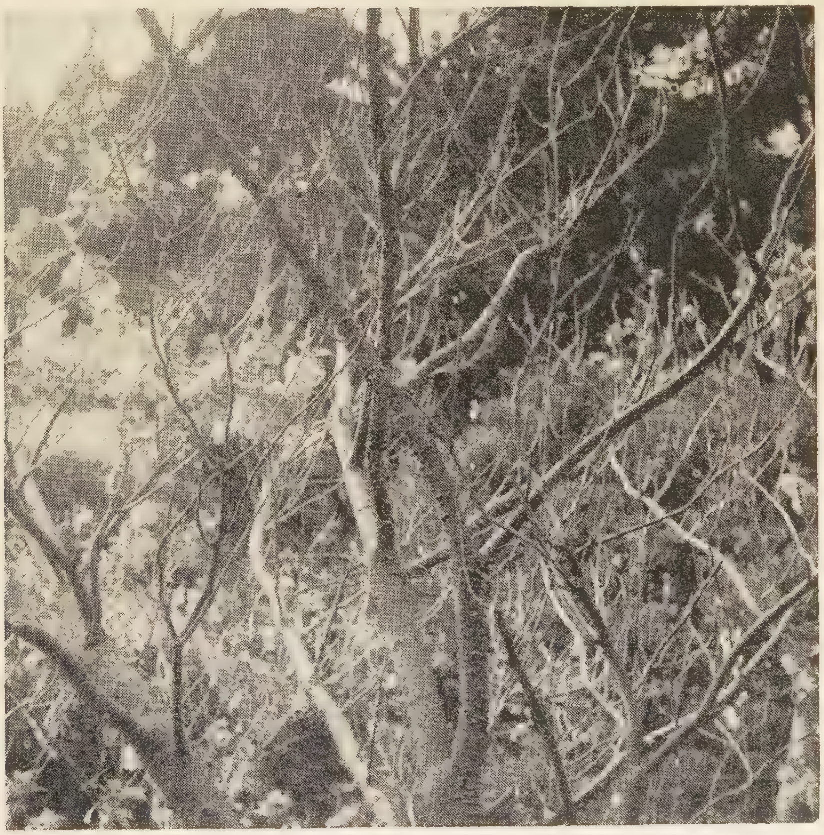
Infection occurs on trunks, twigs, leaves, and fruits. The organism kills the bark, stains the tissue, causes a strong sour odour in the bark, and often causes copious exudation of gum from the cankerous areas. Leaf lesions usually occur as circular spots which often appear water soaked.

The disease is most active in cold, wet weather, especially in succulent growth. Infection occurs through injuries such as those caused by wind, driving rain, hail, frost, insects, and cultural operations. It can also occur through leaf scars for short periods after leaf fall. Where the disease occurs in the district the dormant copper spray should be applied at the leaf-fall stage and repeated monthly during winter. In extreme cases streptomycin sulphate 100 p.p.m. should be used in place of the copper sprays. Packs for making 5 gallons of this spray at this strength are generally available. All diseased wood should be removed and burnt before spraying.

Peach leaf curl: A fungous disease attacking peaches, apricots, almonds, and nectarines, it is so widespread that



Close-up of silver leaf fructifications on cherry wood.



Cherry wood killed by silver leaf fungus and bearing dangerous fructifications.

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it scarcely needs describing in New Zealand. It attacks leaves, shoots, blossoms, and fruits, causing the leaves to become enlarged and distorted and shoots to become swollen and frequently killed. Defoliation often occurs prematurely and growth is virtually stopped. The fungus which causes this disease is *Taphrina deformans*, which overwinters as spores lodged in the bud scales and bark crevices and by means of hibernating mycelium in the shoots. Infected shoots should be removed and burnt. On most varieties the spores can be prevented from attacking the young growths by the application of one copper spray during the dormant season or preferably just before bud movement, in early August.

Cherry leaf curl: Though closely related to peach leaf curl, it is neither so commonly found nor so devastating. With this disease, caused by *Taphrina minor*, the mycelium in the shoots is more important than the spores; infected shoots should be removed and burnt. Spraying is not effective, as the disease is inside the shoots. Infection usually stops the flowering of the plant. Cherries only are attacked. Distorted dead areas are formed on the leaves and shoots are stunted. A peculiarity of the disease is that it attacks only a few leaves on each branch. Whole leaves are not attacked, as with leaf curl, but the infected areas are limited to one side of the leaf, which blackens and shrinks, causing distortion.

Root Damage by Soil Fungi

Especially in wet conditions soil fungi can attack the roots and base of the stem, thus cutting off the sap flow of the plant. Death of the plants can be sudden or the tree may gradually lose vigour and die.

Virus Diseases

While virus diseases are not important in the *Prunus* family in New Zealand, cases of leaf mosaic mottling and distortion should be reported. Viruses are suspected of causing mosaic mottlings in apricots and cherries.

A virus disease known as plum mosaic is known to cause a wide range of symptoms on all *Prunus* species in the country. It is often found in plants grown on cherry-plum rootstocks. While the virus does not appear to affect the vigour of trees or the quality of fruit in orchards, the symptoms of vein banding, chlorotic spotting, ring spotting, and interveinal chlorosis are usually more weird than attractive in the flower garden.

Work in the Flower Garden in March

By JOY WATKINS,
Horticultural Advisory Officer,
Department of Agriculture,
Auckland

Bulbs

Complete bulb planting in the open and in bowls and pots for growing in the home. Inspect bowls which were placed in the dark last month, and move to a cool, well lit position as soon as the "noses" or young shoots are about 2 in. high. Hyacinths can be kept in the dark until the flower spike is almost fully developed. If one or two bulbs in a bowl are not as forward as the majority, place caps of tinfoil over them. They will grow more rapidly than those exposed to full light. Short, sturdy growth is produced only under cool, well lit conditions.

Shrubs, Trees, and Hedges

Prepare ground for shrubs, trees, and hedges which will be planted next month. Remove all perennial weeds.

Dig deeply, incorporating compost and a little bone meal throughout the cultivated depth.

On clay soils improve drainage, if possible, or raise the level of beds which are to be planted with South African and Australian shrubs. These will be short lived unless soil conditions are good.

Prepare a strip of ground 1 yd wide for hedges in the same way as for other shrubs to ensure good, rapid growth. Poor hedges are often the result of poor preparation before planting.

Routine Work

Water plants as necessary.

Remove dead flower heads.

Cut back herbaceous plants as they die back to ground level, but do not cut back any which are still green and healthy, as they will continue to build up the crowns for the next year's blossoms. Spring flowering plants which were cut back after flowering have made plenty of new growth. Some of these (catmint, viola, verbena, and dianthus) can be taken for cuttings.

Disbud dahlias and chrysanthemums to ensure good blooms on long stems for cutting. The terminal bud on each branch should be left to develop, all others being rubbed out as soon as they are large enough to handle. Do not remove leaves when disbudding. Remove summer bedding plants as soon as they begin to fade, so that the ground can be thoroughly prepared for the winter flowering plants.

Sow

Sow winter flowering annuals: stocks, cinerarias (the new double pink is very attractive and long-lasting), pansies, antirrhinum, iceland poppies, calendula, and sweet peas. Plants from this sowing will not be so large and well established by winter and in colder districts they may not start flowering until early spring.

Plant out

Plant out seedlings from sowings made last month of the above flowers.

Plant out seedlings of biennials and perennials so that they are spaced out a few inches apart in a nursery bed or at their full distances in their flowering quarters. Early planting promotes a good root system with fewer losses during winter. Sulphate of potash at ½ oz to the square yard worked into the soil before planting will increase winter hardiness. Some phosphate in the form of bone meal, superphosphate, or blood and bone is beneficial on most soils. Little nitrogen is needed at this time of the year and there should be sufficient residue from the previous crop.

Plant winter flowering plants early and water in well to build up strong, healthy plants which will flower throughout winter.

Most failures of winter bedding schemes are due to planting small seedlings too late in the season, when the ground has become wet and cold.

Lime the ground when preparing it for stocks or wallflowers. Plant bulbs deeply before overplanting with forget-me-not, polyanthus, double daisy, pansy, or similar carpeting plants.

Continue taking shrub cuttings, including roses.

Lift gladioli corms as the leaves go brown. Cut back to within 6 in. of the corm and spread out in an airy place to dry off thoroughly. When dry, clean the corms and dust with thiram and DDT to protect against fungous diseases and thrips. Store in a cool, dry place. Old nylon stockings make good containers. Tiny cormlets of good varieties are worth saving. If sown in shallow drills next spring, they will flower in two or three years. Some may even have a small spike the first year.

Stake and tie trees and shrubs before they are damaged by autumn

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gales. Nylon stockings make strong, soft ties. If a shrub blows over, it should be left in position, if possible, to avoid further damage to the root system. Tie firmly to a new stake, trim back long branches, and place large stones and earth on the disturbed roots.

In many small sections there is not sufficient room for this treatment, as the blown-over shrub may block a path or damage other plants. The shrub should then be removed or re-erected **immediately**. Deepen the hole, fork the bottom, and carefully replace the shrub, packing good top-soil round the roots as in normal planting. Stake and tie firmly. Cut away any broken branches, and trim back the top growth a little. A scrim shield on the windward side will reduce the amount of wilting and help recovery.

Lawns

Prepare the ground for sowing new lawns. Thorough cultivation to destroy weeds and create a good tilth is labour well spent. Rotary cultivation is excellent for the preliminary work, and fertiliser can be incorporated at the same time at the rate of 1 oz of a mixture of equal parts of sulphate of ammonia and superphosphate to the square yard. After this, leave the ground to settle for as long as possible, removing germinating weeds by successive shallow hoeing.

Rake the surface to a fine level tilth, adding ¼ oz of 40 per cent DDT wettable powder to 10 sq. yds. to destroy soil pests. Sow at ½ to 1 oz to the square yard. The higher rate makes a thick sward quickly.

Lawn mixtures are as follows:

Fine Lawn

2 parts by weight of Chewings fescue
1 part by weight of browntop

On light soils which tend to dry out add 1 part by weight of white clover or yarrow.

Hard-wearing Lawns

20 parts by weight of Chewings fescue
10 parts by weight of browntop
5 parts by weight of crested dogstail
1 part by weight of yarrow

This mixture can be sown at ¼ to ½ oz to the square yard. In Auckland and Northland paspalum makes the most satisfactory lawn. This should not be sown in autumn, but in October/November when the soil is warm and damp.

Glasshouse and House Plants

While the weather is good take the opportunity to put all the plants outside in a sheltered place and clean the glasshouse or lathhouse thoroughly.

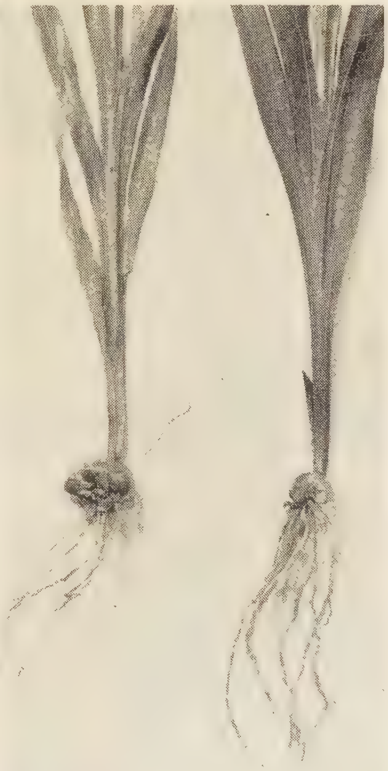
Wash or scrub down with a 2 per cent formalin solution or other disinfectant. Repair broken glass. Repaint if necessary. Do not replace pot plants until all fumes are dispersed. Check heaters.

At the end of March move frost-tender plants from the lathhouse into the glasshouse for the winter, or use them as house plants.

Plant polyanthus in well manured soil for an early spring display. Modern American and New Zealand hybrids have large flowers and long stems and are useful for cutting.

Dry off summer-flowering bulbs and tubers such as gloxinia, achimenes, and tuberous begonias by watering less frequently. Place the pots on their sides or shake the tubers free of soil and dust with thiram to control storage rots before placing in a dry, frost-free position for winter.

Except for winter flowering plants, water and feed less frequently. Any feed should contain a higher proportion of potash than of nitrogen to increase winter hardiness.



As gladioli leaves go brown the corms should be lifted and the tops cut back to within 6 in. of the corm. Dry off thoroughly and remove dead roots and tops and cormlets. Dust corms with thiram and DDT before storing.

Pot up winter and spring flowering plants as necessary, and keep well shaded for a few days after potting. Do not repot other house plants until spring, as they make little growth during the next five months.

Cut turves about 4 in. deep from rich, well grazed paddocks and stack grass-side down to rot, with a sprinkling of lime between each layer. If the only available turf is not well manured omit lime from alternate layers, replacing it with animal manure or blood and bone. This turf stack will provide the turfy loam recommended in soil mixes for seed sowing and potting next spring.

Floral Decoration

Autumn tints are rich and beautiful but not long lived. Use them with glowing bronze and tawny shades of chrysanthemums, celosia, helenium, and other autumn flowers. Catch the light by including clear yellow or lemon to avoid a dull appearance.

Preserve leaves which are turning colour by pressing them between sheets of newspaper. Trim off any overlapping leaves and twigs.

Strip all leaves from branches of berries as soon as these are picked to delay shrivelling. Celastrus, spindle, and callicarpa all last well.

Bells of Ireland are attractive when dried or preserved with glycerine, as described last month.

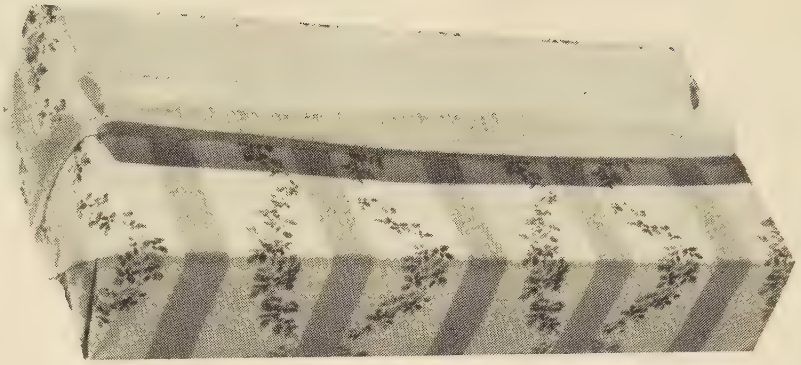
Long-stemmed heavy flowers or branches can easily be arranged at any angle in shallow containers if a cage holder is used.

The size of flowers and arrangements should be in proportion to the size of the room. Large-flowered chrysanthemums will dominate a small room unless used with great restraint. Three of them can be more effective and much more restful than a dozen.

Tissue-box Cover

By ELEANOR COUSTON,
Home Science Instructor,
Department of Agriculture,
Christchurch

AN easy-to-make gift which is both decorative and practical can be made by covering a box of paper tissues with a suitable fabric. Illustrated is one with a glazed chintz cover which can be removed for cleaning and for inserting a new box of tissues.



Materials

THE amount of material required will vary with the shape and size of the box, many types of which are available. The measurements below are for the 200 tissue box illustrated. One which is certain to be replaceable should be chosen.

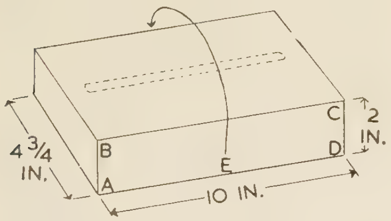
Half a yard of 31 in. material makes two covers.

Bias binding.

Four domes.

Thread to match.

Measuring and Cutting



Hem allowance. Allow ⅝ in. for ⅛ in. turnings plus ¼ in. hems.

For **width** of material required take measurement ABCD and add twice turning plus hem allowance for a narrow hem at each end (14 in. + 1¼ in. = 15¼ in.).

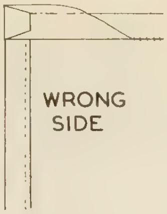
For length of material required take the measurement from E round the box and back to E = 13½ in.

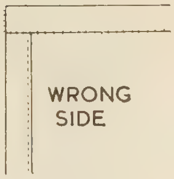
Keeping the grain straight carefully cut the material to these measurements.

Making up

Turn in and stitch hems at both ends of the 13½ in. edges. Press.

Attach bias binding to the remaining two edges and finish off neatly by clipping the corners, turning the ends in and whipping (see following illustration).

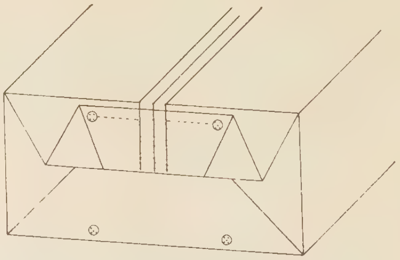




Place the fabric in position round the box. Mark the points at both ends of the slot where the tissues are to be removed. Remove the covering material from the box. Place the wrong sides of the binding together and whip from the points marked for the slot to the hem edges.

Replace the box in the cover, centring the opening of the cover over the slot of the box. Use pins to hold the cover firmly in position.

Fold the ends envelope fashion as though making a parcel. Crease into position.



Remove cover from box and attach domes (see illustration above).

Return the cover to the box.

Tips for Stitching Synthetics

MACHINE stitching on synthetic fabrics can leave a tell-tale trail of carelessness. Because of the high elasticity of synthetic fibres and their high resistance to abrasion, machine stitching must be different for these fabrics from that for natural fabrics. Tension on both top and bottom may need to be slightly looser than that for natural fibres. Before sewing a garment, stitch on the lengthwise grain of a sample and adjust the tension accordingly.

Stitches should be a little shorter than those for natural fibres. A shorter stitch is more elastic and allows more "give" to a seam. This is especially important for crepes.

Use fine, sharp sewing machine and hand needles. Sewing at a slow and even speed helps to keep the needle from getting hot and to retain the thread's elasticity, which is especially important for fine sheers to avoid puckering on the lengthwise grain. Stitching sheers over tissue paper will help to prevent puckering.

—GWYNNETH V. BOSTOCK,
Home Science Instructor,
Department of Agriculture,
Palmerston North

Was not that a dainty dish . . .

. . . to set before the king?

Trimming the Pie

By JUDITH FERRIER,

Home Science Instructor,
Department of Agriculture,
Christchurch

DECORATING a pie crust allows endless scope for imagination, but remember, the most successful pastry is kept as cool as possible and is not over-handled.

TRADITION has it that only savoury pies may be correctly trimmed with pastry leaves, tassels, etc., on the top crust and that sweet, deep dish pies should have a plain top crust with decoration confined to a very simple border.

Unless a funnel is used in a pie which has a very liquid filling, either sweet or savoury, in a single or double crust **several slits are necessary** to allow for the escape of steam which forms from the filling as it cooks. A true pie funnel has an open top to act as a chimney for the removal of the steam which would otherwise collect under the top crust and prevent it becoming as crisp as good pastry should be. For this reason **the funnel should protrude through** the top crust, usually by a small cross cut in the centre of the pastry.

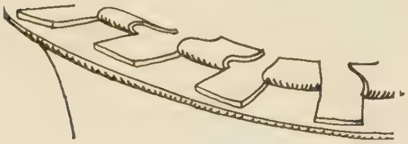
An egg cup used in place of a funnel is the cause of many a soggy pie crust because it provides no outlet for the steam and merely acts as a support for the pastry. The two or three slits which are necessary if an egg cup is used are cut near the centre of the top crust before it goes on to the pie.

Stretching the top crust can be avoided if the prepared circle of pastry is rolled up round the rolling pin and lifted and unrolled into place over the filling. Dampen the edges of the two crusts with water and press them together to form a seal.

Open pies and tarts can be treated with much more imagination ranging from a decorative border trim up to the glamour given by toppings of meringue, fruit juice or liqueur glazes, streusel (a nut, crumble mixture), or a lattice of pastry to show the fruit beneath.

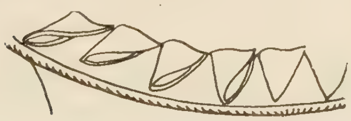
Several different ways for decorating these open shells are given here and unless stated otherwise, instructions are for a pie plate lined with pastry and trimmed level with the edge of the plate.

Clipped Edge



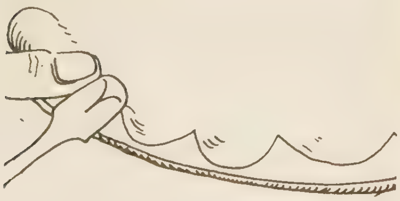
With the kitchen scissors make ½ in. cuts at regular intervals round the edge of the uncooked pastry shell. Dampen alternate strips with a little water, fold these back, and seal to the pastry beneath.

Spiked Edge (Dragontooth)



At intervals of ½ in. make 1 in. cuts round the edge of the uncooked pastry shell. Dampen each with a little water and fold the left hand corner of each strip down to meet the base of the next cut to form a diagonal fold. Seal the corner only on to the pastry beneath, leaving the fold rounded to keep each "tooth" as high as possible.

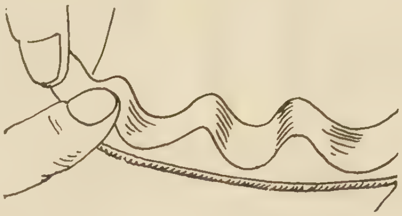
Scalloped Edge



Line the pie plate and cut the dough 1 in. larger than the edge all round. Roll under the extra to the level of the edge of the plate, forming a high, thick rim. Place the forefinger of the left hand firmly on this rim and use the end of a spoon handle or a knife blade turned side on to push the pastry inward at the right of the finger, forming the scallop. Repeat at regular intervals round the shell.

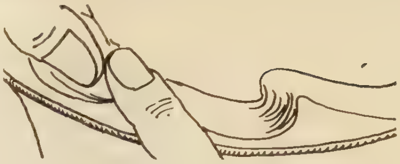
For variation, pinch the rounded scallops into tight points.

Crimped Edge



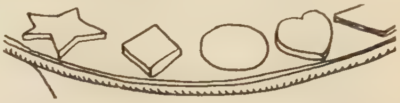
Prepare the edge as for scallops, but instead of placing the finger flat down on the edge, hold the pastry rim between the forefinger and thumb of the left hand and use the forefinger of the right hand to push the pastry in against the other finger. Repeat regularly round the edge of the shell to form a high, standing crimped edge.

Diagonal Edge



Proceed as for the crimped edge, but instead of pushing straight in with the right hand, push diagonally in toward the left, at the same time bringing the pastry under the left hand diagonally out to the right. Repeat round the crust.

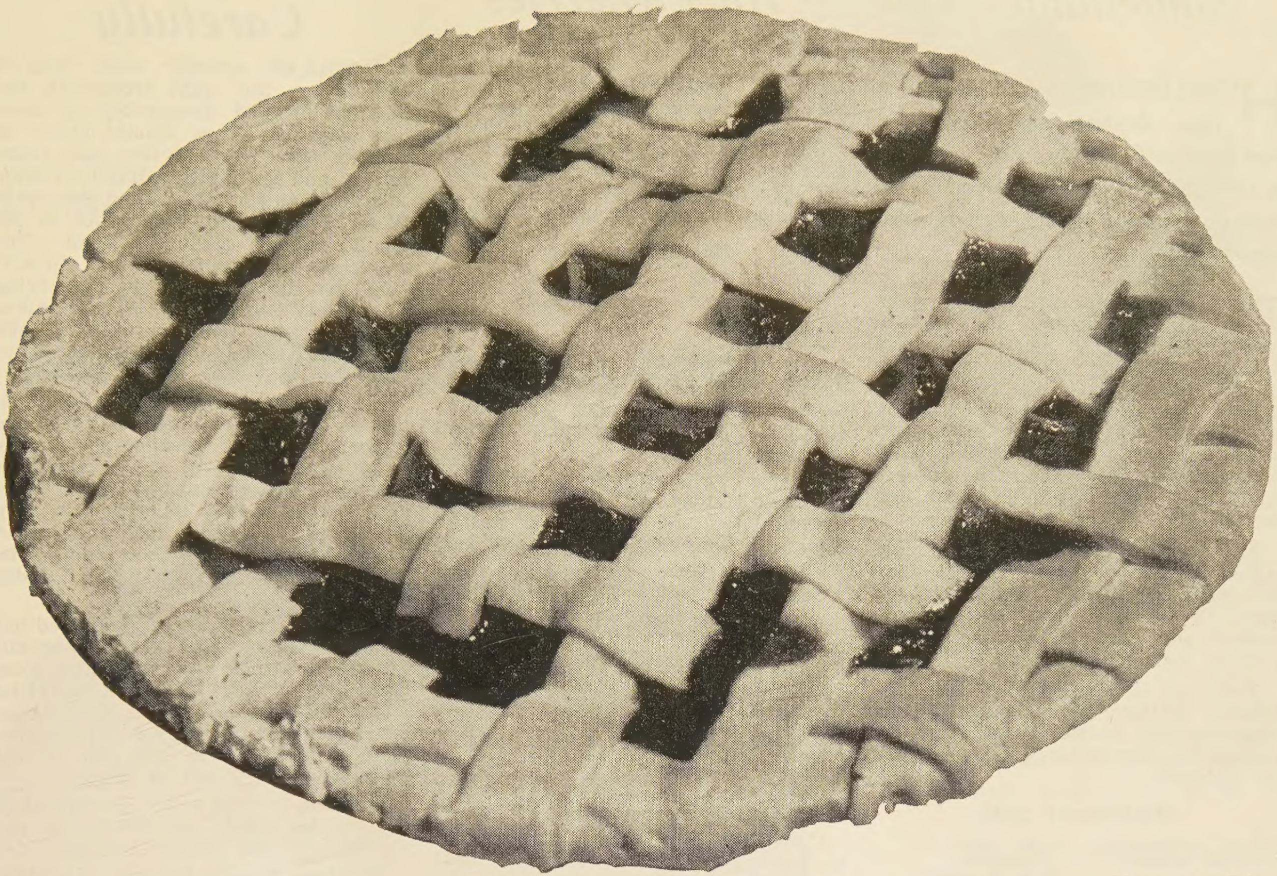
Applique Edge



With tiny cocktail biscuit cutters cut out a series of pastry shapes (stars, diamonds, squares, etc.). Dampen

[*Green and Hahn*

The pie funnel should do more than support the pastry crust. It must protrude through the crust to act as a chimney for the removal of the steam formed during the cooking of fairly liquid fillings such as the gravy in this meat pie. Two or three slits cut near the centre of the top crust will serve the same purpose when an egg cup is used to support the pastry.

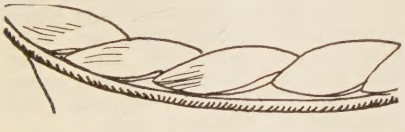


[Green and Hahn

Whipped cream will be piped round the edge of this lattice-topped tree tomato pie before it is brought to the table.

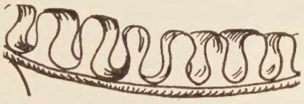
slightly with water and fix them in position round the border of the uncooked pastry shell. They could be overlapped (all one shape) or placed flat next to one another (best for a mixture of shapes).

Coiled Edge



Cut several strips of pastry ½ in. wide. Dampen the rim of the pastry shell with water and fix the end of one strip in position on this with the length of the strip parallel to the edge of the plate. Hold in place with the thumb of the left hand and use the fingers of the right hand to twist the strip. Press down on to the dampened pastry **between** each twist, taking care not to stretch the strips as they are twisted or the edging will shrink and break during baking.

Ruff Edge



Cut ½ in. wide strips of pastry and dampen the rim of the shell with water. Hold in position and begin as for the coiled edge, but do not twist the strip. Place the forefinger of the right hand about 1½ in. along the strip from the thumb of the left hand. Bring this part of the strip up to lie close against the thumb, forming a loop of pastry. Seal down here. Repeat round the edge, making the length of pastry in each loop the same.

Weaving a Lattice Top

Line the pie plate with pastry, trimming it ½ in. beyond the edge of the plate. Fill with drained cooked fruit or with a mixture of raw fruit and sugar, mounding it up slightly in the centre. Cut 14 strips of pastry ½ in. wide and about the diameter of the pie plate in length. Some can be slightly shorter. Lay seven strips one way across the filling, spacing them evenly from the centre. Fold strips 1, 3, 5, and 7 half back and place one of the remaining seven strips across the centre of the pie at right angles to the others.

Straighten out the folded strips over this cross strip. Now fold back strips 2, 4, and 6 to the level of the first cross strip and place a second cross strip over the pie parallel to the first. Repeat, working from the centre out to both sides, folding back alternate strips each time a cross strip is added, until the seven cross strips are woven through the lengthwise strips. Space the strips as evenly as possible. Dampen the outer ends of each strip. Seal down on to the lower crust, trim level with the edge of the plate, then roll the extra ½ in. width of pastry in over the ends and seal down. Complete by crimping or scalloping the edge.

Shortcrust pastry is generally considered the most satisfactory type to

(Continued at foot of page 208)

Something New — Huckleberries

HUCKLEBERRIES came on to the New Zealand market for the first time in February 1960. Though in limited supply, they proved to be very popular and should be in greater supply this year.

THEY are similar to black currants in appearance, but are a little larger and have a very distinctive flavour. They are not very palatable to eat straight from the plant. The berries should never be used when they are green and they are better kept for about 10 days after picking before using. They are ready for use when they have lost their lustre and developed a dull appearance.

As the vitamin C content is high, similar to that of black currants, they are quite a valuable addition to the diet. They are very sweet when cooked and seem to be particularly popular with the men folk.

They can be preserved in the deep freeze, bottled, or canned, and a delicious cold souffle can be made by mixing the fruit and sugar in a blender or liquidiser.

Huckleberry Jelly

3 lb of huckleberries
3 lemons (minced)
3 tart apples (chopped)
2¼ lb of sugar (approx.)

Crush the berries and add the lemon and apple. Just cover with water and cook until soft. Put into a jelly bag and strain.

Add three-quarter pound of sugar for every pint of juice and boil for approximately five minutes.

Huckleberry Jam

5 lb of huckleberries
5 lb of sugar
5 pints of water
Juice of 3 lemons

Boil the berries, water, and lemon juice until all are tender, crushing the berries while cooking. Add the sugar and boil until the jam coats a spoon.

Huckleberry Pie

2 cups of huckleberries
½ cup of water
Juice of 1 large lemon
6 oz of sugar
Cornflour for thickening

Stew the berries with the water and lemon juice, crushing them as they soften. Add the sugar and finish cooking. Thicken with cornflour and set aside to cool.

Line a well greased pie dish or plate with short pastry, fill with the stewed fruit, and cover with pastry. Cook in a hot oven, turn out, and dust with icing sugar.

Serve either hot or cold with cream.

Huckleberry Cake

3 oz of huckleberries (hulled and washed)
3 oz of sugar
6 oz of butter
2 oz of brown sugar
¾ cup of cooked berries
2 eggs
6 oz of flour
1½ teaspoons of baking powder
1 teaspoon of cinnamon

Cook the berries with the sugar, crushing the berries, and cool.

Cream the butter and sugar. Beat in the eggs one at a time, then beat in the fruit. Sift the flour, baking powder, and cinnamon and add to the mixture. Cook in a moderate oven, 350 degrees F, for three-quarter to one hour.

—PATRICIA M. de LAUTOUR,
Home Science Instructor,
Department of Agriculture,
Palmerston North

Trimming the Pie

(Continued from page 207)

use for open pies with a decorated edge, as it is better able to withstand the extra handling than are flaky and puff pastries.

Biscuit Crumb Pie Shell

As a variation for sweet tarts a crust made from crushed biscuit crumbs is very popular because of its ease in preparation and for the extra flavour it can give to complement the filling. The most suitable biscuits to use are the plainer varieties such as wine, malt, tennis, and gingernut. Store broken biscuits and crumbs from the packet in an airtight tin.

Crush the crumbs to an even fineness and mix thoroughly with the sugar.

1½ cups of biscuit crumbs crushed as fine as breadcrumbs
¼ cup of white sugar
½ cup of butter, melted

Stir in the melted butter and combine with a fork so that all the crumbs are coated. Press an even thickness of the mixture out to line a 9 in. pie plate to the edge. Use the back of a spoon to pack the crumbs firmly together. Neaten the edge by trimming it with a knife.

Either leave overnight in the refrigerator or bake for eight to 10 minutes in a moderate oven 325 degrees to 350 degrees F, watching carefully that it does not burn.

Fill the prepared shell with a cold filling.

◆◆

Wash Wool Carefully

WOOLLEN articles wash well if given the right treatment, but may be harmed irreparably by careless washing. They should never be rubbed while wet, as this may cause felting and shrinkage. Hand washing is preferable for all woollen garments. Water that is comfortably hot to the hands will be right for wool. The whole process should be done quickly; woollens should never be left lying wet. Only enough pure soap or other mild detergent should be used to make a good lather that will last throughout the wash.

Woollens should never be allowed to become too soiled before they are washed. Soiling disappears readily from wool if warm soapy water is squeezed through and through it. Very dirty parts should have a few soap flakes rubbed lightly into them with the finger tips and then should be squeezed out several times under water.

Woollens should not be stretched out of shape during washing and particular care is needed in lifting them from water. The whole garment should be supported so that there is no drag on it; if it is picked up by one point, the weight of water in the rest of the garment drags it out of shape.

Woollens should never be wrung or twisted by hand, but should be put through a loose rubber wringer.

Woollens should be well rinsed in water about the same temperature as the washing water to get rid of all traces of soap, which, if left in, destroys the soft fluffy feel of wool, tends to give a yellow discolouration to white wool, and dulls the brightness of coloured wools.

As much water as possible should be removed from woollens after the last rinse. Folding in a towel for the final run through the wringer is helpful.

Garments should be put to dry immediately. Knitted woollens are best dried on a flat surface in an airy place not in direct sunlight and not over radiators, hot pipes, or any other source of heat. Direct heat can cause yellowing of white woollens and streakiness of coloured ones.

When quite dry woollens may be pressed carefully with a warm iron over a damp cloth. Ribbing is not pressed.

Cashmere, mohair, and angora are washed in the same way as wool. Angora should be shaken gently while drying to restore fluffiness.

—MAUD B. STRAIN,
Home Science Instructor,
Department of Agriculture,
Dunedin

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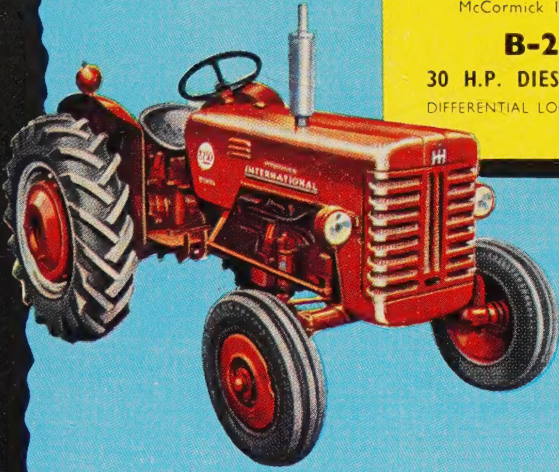

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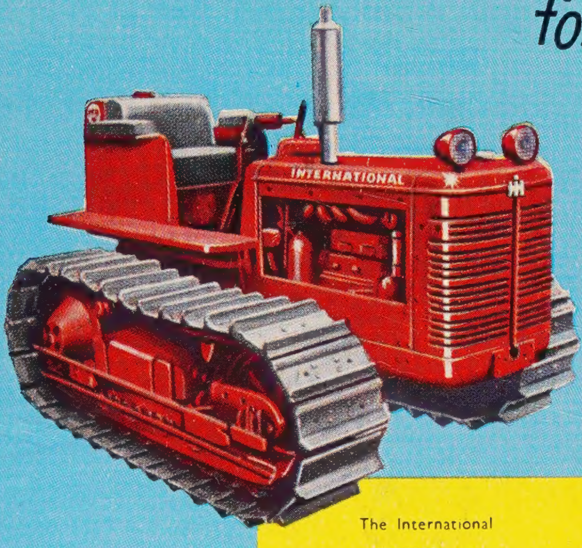

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